American Machinist

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SHOP EQUIPMENT REVIEW

Semi-Annual résumé of machines, tools and accessories described in the Shop Equipment News section of the American Machinist during the last six months of 1926

Principal Developments

THE eighth semi-annual Shop Equipment Review number of the *American Machinist* covers in the American section, 324, and in the European section, 74 machines and pieces of equipment brought out during the six months ending Dec. 31, 1926. The period has been one of refinement rather than development.

Centralized control is becoming popular, and in several types of machines combination brake-clutches are used to shift speeds instantly without stopping the machine. The increased use of anti-friction bearings is also apparent. Where improvements have been made over former models, it is usually found that the construction is more rigid and the range greater, so that heavier cuts can safely be taken at higher speeds. Full automatic control is becoming increasingly prominent. Motor drive, usually integral with the machine, is the order of the day, and belt drive to a constant-speed pulley is generally optional.

A side head has been added to a standard boring mill to include an outside finishing operation in the range of the machine. Two mills for railroad shop use have appeared on the market, together with a complete line of boring tools for the same purpose. A vernier attachment and two sizes of angular dividing tables are offered for greater precision in jig boring. An automatic machine for boring connecting rods with diamond tools is also noted.

Hydraulic feed is becoming popular for drilling equipment, especially with multiple-spindle machines. Improvements in radials include motor on arm, anti-friction bearings, central control from the head, power-clamping, mechanical interlocks, and traversing bases for plate drilling. Many special-purpose machines of both horizontal and vertical types are also described. Sensitive drills are invariably ball bearing equipped, as are the portable electric drills.

Four disk grinders are listed in extreme capacities of 15 and 72 in. Two large surface grinders have been brought out, one having a bed 28 ft. long. Several universal and tool grinding machines have been developed featuring built-in motor drive to the wheel, the workspindle, and the table, respectively. A centerless grinder shows many improvements. More than ever, special-purpose grinding machines are in evidence. Five new lines of floor grinders have appeared, all featuring adjustable-speed ball-bearing spindles and motor drive.

Many improved lathes have been placed on the market, both engine and turret. More rigid construction is featured, as well as anti-friction bearings, all-geared heads, and simplified control. One automatic lathe involves several radical departures from the conventional.

Changes in milling machines have been largely of size, although one die sinker has an oscillating spindle that increases its ordinary range of usefulness. One standard shaper reflects the same trend as in other tools, namely greater rigidity, anti-friction bearings, and centralized control.

Many automatic tapping machines have appeared, several of the multiple-spindle type. One machine has a synchronized conveyor system for indexing the work to be tapped. Three pipe threading machines are also described, one being mounted on a portable base.

LISTED under other machines are two plate-bending machines of 6- and 16-ft. capacity, respectively. Two new sizes of broaching machines are now available, and four cutting-off machines for both pipe and tube have appeared. Other items include: a steam hammer of massive proportions with several safety features; a new size hobber for cutting gears of coarse pitch up to 42 in. in diam. on a production basis; two automatic lapping machines for automotive use, one for crankshaft bearings, the other for cylinder bores; metal cutting saws of the circular, band and reciprocating types; and two automatic arc welders for tank and seam work.

Among measuring apparatus, it is noted that the development of optical instruments for precision measurements is spreading. In the line of material-handling equipment, a large size industrial truck has been entered in the field. It has a capacity of 10 tons and has six wheels.

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Boring and Turning Machines

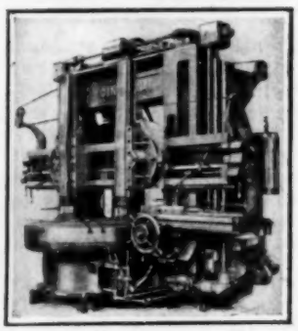
—1—

Boring Mill, Side-Head, 6-Foot

Cincinnati Planer Co., Cincinnati, Ohio. [Vol.65,p.227]

The 6-ft. boring mill illustrated has a rapid-traverse side head. The side head is capable of machining work of any height within the capacity of the mill, and the ram is constructed so that it can reach almost to the center of the table. With this third head the work can be turned while the other heads are boring and facing respectively.

The side head has rapid-power traverse in all directions, obtained by means of an individual motor placed on the side of the housing. This motor is controlled by means of a drum controller,



the movements of which are inter-connected with a direction shifting lever. The construction of the housing and saddle is similar to that of the rail and saddle. It is possible to run the side head to its extreme limit and still take a large cut.

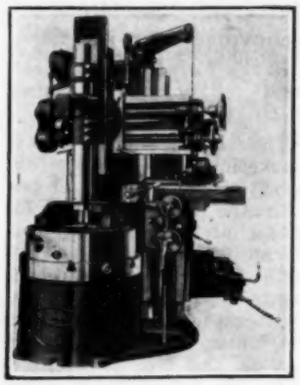
The side head can be provided with a crowning or taper attachment. A thread-cutting attachment can also be supplied. The change levers for the table drive have been brought to the front of the machine on the same side as the side head. The start and stop levers are in the same position. In this way the control of the machine is centralized.

—2—

Borer and Facer, Driving-Box

Bullard Machine Tool Co., Bridgeport, Conn. [Vol.65, p.342]

The design of the improved driving-box boring and facing machine incorporates a



heavier support for the bar and cutting tools and an adjustment in bar extension from the main slide to adapt the machine for various lengths of boxes. For short boxes where little extension is required, the cutting tools are supported closer to the point of cutting to prevent deflection.

The machine is equipped with a heavy, two-jaw self-centering chuck. The table is provided with a graduated micrometer cross adjustment for the accurate boring of reliefs. Another feature of the machine is a constant-speed drive pulley with a multiple-disk clutch and brake for starting and stopping. All speed and feed changes are obtained by means of sliding gears. The standard Bullard features are also incorporated in the machine, such as power rapid traverse and constant flow lubrication. Direct reading scales and micrometer dials are provided on the feed rods. The machine has also been strengthened on all parts, subject to the strain of heavy cutting.

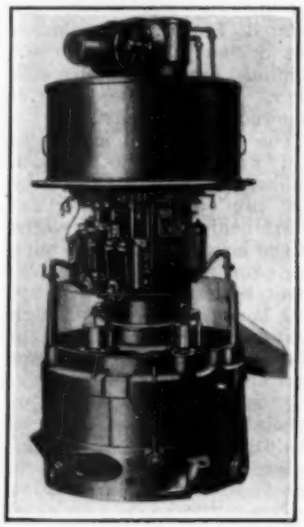
—3—

Turning Machine, Mult-Au-Matic, 4-Spindle, 6-Inch

Bullard Machine Tool Co., Bridgeport, Conn. [Vol.65, p.545]

The 6-in., 4-spindle machine shown has been added to the line of Mult-Au-Matics marketed by this company. Besides differing in size and number of spindles, the machine is claimed to be more economical of space and to have incorporated several important features of the smaller size machines. It has a heavy circular cast base, which contains reservoirs and pumps for both the lubricating oil and the cutting compound. The central column is square in section with the tool heads and ways mounted on three faces and a door in the fourth. The work-spindle carrier supports four spindles equally spaced.

A feature of the machine is the power chucking device. By a single throw of the operating lever in either direction the work is gripped or released. The three machining stations may each be fitted with a plain vertical head, a compound horizontal head or a standard universal head, giving vertical, horizontal or angular tool feeds. Double-purpose heads can also be used to give a ver-



tical feed combined with a horizontal or angular feed at a single station.

The full swing of the work is 10-in. in diameter for pieces 5 in. high, and 6½-in. in diam. for work up to 7½-in. high. Spindle speeds may range from 30 to 480 r.p.m., while tool feeds may be set from 0.0003 to 0.114 in. per revolution.

Power for the machine may be obtained either by belt connection from a countershaft or by means of individual motor drive. In the latter case a 7½-hp. motor is recommended. The overall height of the machine is 104 in., and the base covers a floor space 48-in. in diameter.

—4—

Boring Machine, Car-Wheel, 48-Inch

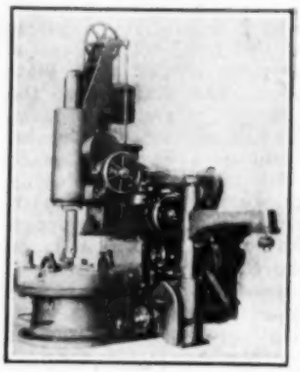
Putnam Machine Division, Manning, Maxwell & Moore, Fitchburg, Mass. [Vol.65, p.1084]

The car-wheel boring machine shown has a capacity to bore wheels from 16½ to 42 in. in diam. as measured over the treads. It is furnished with a hand-operated, pneumatic, or automatic power-operated chuck, as desired. The chuck spindle is hollow, providing free passage for chips to a pit beneath.

The vertical boring spindle has rapid traverse by power in both directions, and four changes of feed. An automatic trip disengages the power movement before the spindle reaches its limit of travel. The horizontal ram for facing the hubs of wheels is similarly equipped with respect to its power movements.

The table drive has been improved by the employment of a forged nickel-steel pinion meshing with an accurately cut gear of high-carbon steel. The pinion is supported by ample bearings of bronze on both sizes.

The machine may be equipped with either mechanically-operated or pneumatic cranes as desired, for one or both sides of the machine. The pneumatic crane is controlled by a single lever, and the load will stop in any pre-



determined position. The mechanically-operated crane derives its power from a separate motor.

The main drive to the machine is through a self-contained gear box, giving four speeds in geometric progression. The gear shift is of the selective type. A friction clutch is employed in the drive to start the machine, and disengagement of the clutch automatically applies a friction brake.

The machine may be driven by belt or by a direct-connected motor. By using an adjustable-speed d.c. motor the gear box may be omitted and the armature shaft of the motor coupled to the pinion shaft of the table drive.

The floor space required, including the swing of one crane, is 10 ft. 9 in. by 12 ft. 2 inches.

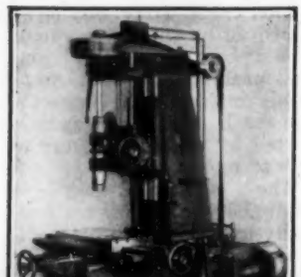
—5—

Borer, Jig

Pratt & Whitney Co., Division Niles-Bement-Pond Co., Hartford, Conn. [Vol. 65,p.808]

Several improvements in the jig borer have been made. The spindle pulley has been widened, and the idler pulleys are now made adjustable so that the tension in the belt can be regulated easily at any time.

The motor has been rearranged to make the machine more compact. It is now hung on a swinging platform and the motor is mounted on



its side. With this arrangement it is possible to adjust the belt tension by means of the screw on the motor platform. The drive from the motor is through a large size friction clutch pulley inclosed in a cast-iron guard which may be shifted easily from a vertical to the horizontal position for countershaft drive, when it is so desired.

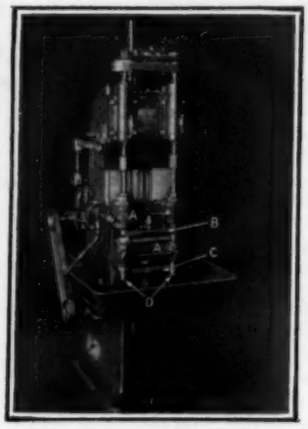
Spacing of holes is obtained by means of a combination of end measures for even inches, inside micrometers for fractions of an inch, and a micrometer dial for ten thousandths of an inch. The traversing screws have no connection with the measuring instrument.

—6—

Boring Machine, Diamond Tool, "Coulter"

Automatic Machine Co., Bridgeport, Conn. [Vol.65, p.73]

The machine has been developed for boring the wrist pin and crank bearing holes in connecting rods for automotive engines by means of diamond cutting tools. The machine is driven by a system of belts from a 3-hp. motor which sets inside the column. The column of the machine above the splash-pan is of open-side box section, between the sides of which the feed cam drum and its driving mechanism are located. Both boring spindles are driven by a single belt running over an adjustable idler. The spindles run in tapered bronze bearings.



The entire head moves up and down on the column, guided in its movements by the cam upon the vertical shaft behind it. The weight of the head is supported upon the cam, and the feed movement is actuated by gravity. The boring bars pass through cast-iron sleeve bearings in the upper part of the fixture and are attached to the driving spindles by means of special floating couplings of the Oldham type. Plugs located in a fixture bolted to the face of the column serve to locate the work. An axial hole in each plug receives a pilot on the lower end of the respective boring bar to give additional support to the boring tool.

The cycle of the machine is as follows: The operator places a connecting rod over the plug in the fixture and depresses the trip lever. The locating spindles rise and push the plugs through the rough-bored holes, and a clamp bar is then forced down tightly to hold it for boring. The head descends rapidly until the pilots on the boring bar enter the axial holes in the locating plugs when the spindles begin to revolve. The rotating bars descend slowly together. At the completion of the cut the boring bars stop rotating and the parts return to their original positions. The boring tools are specially formed diamonds, made expressly for this machine. One spindle revolves at 2,500 and the other at 5,000 r.p.m. The floor to floor time is one minute.

The machine weighs 3,900 lb. and occupies approximately 30x40 in. of floor space.

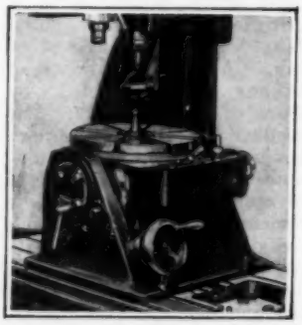
—7—

Tables, Jig Boring Machine, Circular, Universal, "Société Genevoise"

R. Y. Ferner Co., Investment Bldg., Washington, D. C. [Vol.65,p.425]

The above company is marketing two sizes of universal circular tables for use with the high-precision locating and jig boring machines made by the Société Genevoise D'Instruments de Physique, Geneva, Switzerland. The smaller of the tables, illustrated, is for use on the No. 4 machine, while the larger table is intended for use on the Nos. 5 and 6 machines. It is claimed that with the aid of these tables holes can be laid off and drilled on workpieces in the horizontal plane, as with the regular circular table, and also bored on different faces of the same piece, either parallel, radial, or obliquely radial about the central axis of the workpiece.

In both cases the dividing table revolves about a long central pivot and the rotation is controlled by means of a worm screw fitted with a reading drum, graduated to



20 sec. of arc, while a vernier permits estimation of 1 sec. of arc. The table is set on a horizontal axis and its upper surface may be set to any angle from 0 to 90 deg., read to 1 min. of arc by a vernier. Special keys are provided for the correct lining up of the fixture on the table of the jig boring machine.

In order to locate accurately the center of the table with reference to the axis of the spindle of the machine, a spherical-ended center pin is supplied, and a level is fitted between the spherical end of this pin and a center mounted in the spindle.

The small dividing table has a diameter of 11⅞ in. and the large table is 17⅞ in. in diameter. The net weights are 300 and 425 lb. respectively.

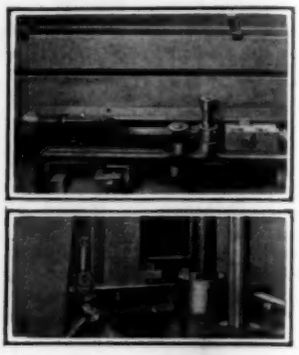
—8—

Vernier Attachment, Boring Machine

Universal Boring Machine Co., Hudson, Mass. [Vol.65, p.811]

As special equipment to the No. 24 and 44 "Tri-Way" boring machines a vernier attachment is offered.

The vernier plate proper is mounted upon an adjustable plunger that has a movement slightly greater than 1 in. Adjustment is provided



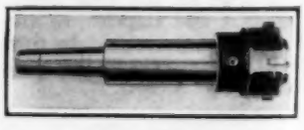
by means of a standard forty-pitch micrometer screw. By means of a locking screw the vernier is held firmly in position so as to prevent accidental movement. With this attachment holes can be bored accurately long after the feed screws have lost their initial accuracy.

—9—

Boring Tools, Driving-Box and Car-Wheel

Kelly Reamer Co., Cleveland, Ohio. [Vol.65,pp.613 and 695 (erratum)]

The driving-box and car-wheel boring tools are of the block-unit type, and it is possible to bore a complete range of sizes with one bar and the different block units. The support bar is placed in the machine, properly aligned. Different sizes of block units can then be quickly interchanged in the bar for different size bores.



For very large bores a special support head is placed upon the bar.

The block units are heavily constructed to withstand the loads and shocks to which they are subjected. The blades are made of special analysis high-speed steel of ample cross-section and are

adjustable. The adjustable block units that are used for roughing cuts are of two-bladed construction. In the driving-box boring bar, three-bladed construction is used for the finishing cut, with the third blade sets slightly behind the roughing blades.

The driving box boring tool has a bar 6¾-in. in diam. and the tool is designed to bore boxes ranging from 8 to 14 in. in diam. When the tool is used with a standard support head, diameters up to 30 in. can be bored. The adjustable block unit car-wheel boring tools are made in two sizes: No. 1 will bore holes ranging from 5½ to 7½ in. diam., while No. 2 will bore holes ranging from 7 to 9 in. in diameter.

Drilling Machines

— 10 —

Drilling Machine, Production, No. 340, 20 Inch

W. F. and John Barnes Co., Rockford, Ill. [Vol.65, p.579]

The No. 340—20 in. production drilling machine is rated to pull a 1¼-in. high-speed drill to its full capacity in steel. It is built in either single spindle or gang-drill types. The design of drill follows closely previous models made by this company, but the chief departure is in the form of a built-in motor

drive with the motor mounted on the rear of the head. Individual drive from separate motors is used for the gang drills, which are furnished with two to six spindles. The motors are rated at 5 hp. at 1,200 rev. per minute.

Spindle speeds ranging from 104 to 418 r.p.m. are available by means of pick-off gears. Twenty-four feeds, ranging from 0.005 to 0.115 in. per rev. can also be obtained by means of pick-off gears. Both the main and the intermediate drive shafts are carried on Timken roller bearings running in a bath of oil. The driving gear is located at a low position so as to reduce the torsion in the spindle when extended.

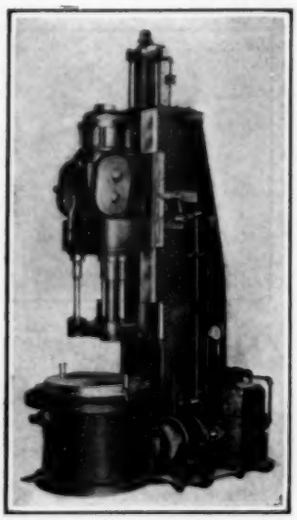
The vertical travel of the table is 16 in. for the single-spindle drill and 12 in. for the gang drill. The spindle travel is 12 in. in each case. The table size is 16x16 in. for the single-spindle machine, while the table sizes for the gang drills range from 16x40 in. for the 2-spindle machine, to 16x136 in. for the 6-spindle machine.

— 11 —

Drilling Machine, Vertical, with Oilgear Feed

Rockford Drilling Machine Co., Rockford, Ill. [Vol.65, p.1083]

This vertical drilling and boring machine with Oilgear feed is for general purpose production work. The machine is designed with a vertical motor built integral with the head. The drive is through a worm and worm-wheel. Pick-off gears are used for obtaining speed changes. The head can also be arranged for one or two speeds obtainable through a hand lever at the front of the head. Any arrangement



or number of spindles can be supplied to suit the particular requirements of the job to be performed.

The entire head carrying the drive, as well as the spindle unit, traverses up and down on the ways of the column by means of an Oilgear pump and cylinder. Two types of control are available: either hand control giving feed as well as rapid traverse in either direction, or an automatic control. With the automatic control, rapid traverse is obtained in both directions and two different feed speeds can be obtained in a downward direction.

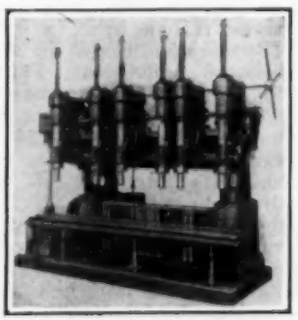
The table for this machine can be furnished in a number of different styles. It can be of the indexing type, as shown, for either hand or power indexing; it can be of the stationary type, either square or oblong; or it can be of the cross-sliding type with either hand or power feed. Various diameters of indexing tables can be furnished as required.

— 12 —

Drilling Machine, Rail-Type, Multiple-Spindle

Rockford Machine Tool Co., Rockford, Ill. [Vol.65,p.226]

The production rail-type drilling machine is claimed to be of rigid construction and designed with all details proportioned to meet the heavy



loads of operation at maximum capacity. The table is supported at six points and is anchored. Two milled T-slots run the full length of the table and the heads of the machine have individual adjustment made by means of a crank through a rack and pinion on the rail. The minimum distance between the centerline of the heads is 9 in. Each head has an individual speed and feed changes through pick-off gears. The spindle speeds can be varied from 150 to 940 r.p.m., with a maximum feed of 0.040 in. per revolution.

The speed and drive shaft are equipped with ball and roller bearings. The machine is provided with two to six spindles, as required. Each spindle is fitted with a No. 4 Morse taper.

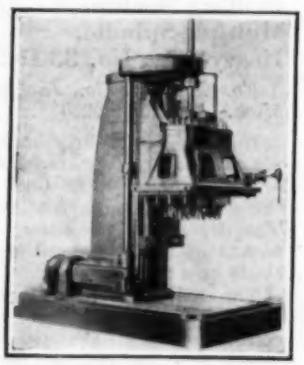
The machine is furnished either motor or belt driven. A variable-speed d.c. motor is recommended and, when furnished, is mounted on the base at one end of the machine.

— 13 —

Drilling Machine, Multiple-Spindle, with Hydraulic Feed, "Natco"

National Automatic Tool Co., Richmond, Ind. [Vol.65, p.261]

The hydraulic-feed, multiple-spindle drilling machine was designed to meet the demands of maximum produc-



tion on a quantity of relatively large holes. It has a capacity for drilling twelve 1-in. holes in cast iron at 0.010 in. feed, and 60 ft. per min. peripheral speed.

An Oilgear pump and mechanism supplies the feed and rapid traverse to the head. The control is automatic. Movements of the head in both directions are limited by means of adjustable dogs on a plate provided at the right side of the machine. The machine is designed with centralized control. Two levers are provided: one lever starts the head cycle, which is later controlled by the adjustable dogs; the other is an emergency lever and is used to throw the head into reverse.

Four types of head with various combinations of drilling spindles may be used with this machine. All heads are arranged with independent change of speed to each spindle.

The base of the machine is heavily ribbed both lengthwise and crosswise. The working surface of the table is 53x39 in. Five T-

slots are provided for clamping fixtures. A 4-in. channel surrounds the work surface and is used to catch the coolant.

The column of the machine is of the box-section type and is made exceptionally heavy in order to prevent deflection under heavy load. Power may be provided through either belt or direct motor drive. A 30-hp. motor is required to drive the machine. The power is transmitted through a horizontal shaft mounted on ball bearings. Heat-treated gears connect this shaft with a vertical inclosed shaft that transmits the power through a train of spur gears on the top of the column. The machine is equipped with a cascade oiling system. It weighs approximately 15 tons.

—14—

Drilling Machine, Multiple-Spindle, Heavy-duty, No. 33-HC

Fox Machine Co., Jackson, Mich. [Vol.65,p.925]

In this heavy-duty multiple spindle drilling machine, an Oilgear hydraulic feed to the drilling head is featured. The drive may be either by means of a friction countershaft or a motor.

The drive is into a gear box located in the base of the column. Alloy heat-treated gears mounted on ball bearing shafts are used throughout to form a sliding gear

transmission for the selection of one of three speeds for the drill spindles. A set of spiral bevel gears transmits the drive from the gear box to a vertical double splined shaft which engages a gear in the head.

The Oilgear pump is capable of producing rapid travel to the head in either direction and an adjustable drilling feed. Adjustable stops regulate the amount of rapid head movement and the depth of drilling feed. A fine adjustment for the drilling depth is provided for use in drilling blind holes.

Once started, the operation is automatic. At a predetermined point the stops automatically slow down the feed for drilling, and at the completion of the drilling operation the head is rapid traversed back to its original position. At any time during the cycle, however, the operator can use manual control.

The drilling head and the saddle are separate units. The head can be furnished in a great variety of sizes either round or rectangular. Likewise spindles of any desired size can be furnished. These spindles can be supplied with individual speed controls. Standard machine construction provides for a feed cylinder having a 12-in. stroke and provision is made for the mounting of an 18-in. stroke cylinder should occasion require one. The head can be adjusted to any desired range.

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Drilling Machine, No. U-12, "Hole-Hog"

Moline Tool Co., Moline, Ill. [Vol.65,p.1089]

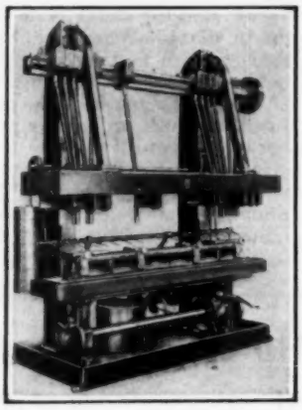
The "Hole-Hog" No. U-12 drilling machine has a jig and the necessary spindles for the drilling of tractor frames made of rectangular tubing. Since the drive to the drills is through the universal-jointed and telescoping shafts, the machine may be adapted to any production drilling of holes within an area 8 ft. long by 12 in. wide. The minimum center distance between spindles is 1¾ in. Similar machines having from one to four columns and in lengths from 2 to 24 ft. can be furnished. The machine is intended for belt drive.

The drive is the spiral gear type developed by this company. The main spiral is hardened and lapped, and independent driving units carry bronze gears that mesh with it. They are adjustable laterally along the upper rail.

The lower rail is box section of liberal proportions. Two t-slots are provided on each side for clamping the spindle housing.

The spindles are made of heat-treated steel of liberal dimensions. The ball thrust bearings are also of large proportions. In order to accommodate the various lengths of drills, the spindles have 1½-in. vertical adjustment.

The feed and table mechanism is of standard construction. The cam is designed to



give the table quick approach, slow feed, and quick return. The table has a 5-in. vertical adjustment independent of the cam travel. The clamping of work is accomplished by four screws which can be swung out of the way to clear the work as soon as they are loosened. The jig is designed to give a minimum of chip trouble by having the work rest on hardened Vs and being relieved at an angle between the supports to throw off the chips and cutting compound.

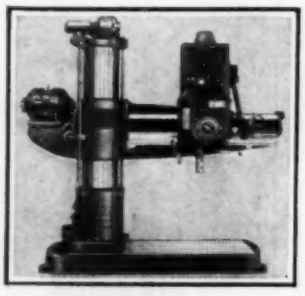
—16—

Drilling Machine, Radial, 5- and 6-Foot, "Super-Service"

Cincinnati-Bickford Tool Co., Oakley, Cincinnati, Ohio. [Vol.65,p.567]

Many departures from the usual practice in the design of drilling machines have been made in the "Super-Service" radial drills. Thirty-six speeds have been provided on the 5- and 6-ft. machines and these are all located in the head. The drills are also equipped with rapid power traverse.

Roller bearings are used on all important moving parts, including the spindle.



An automatic oil system is provided, making use of the Purolator oil filter. There are eighteen feeds including leads for pipe taps. The speed and feed changes are made by means of selective sliding gears. All shafts have multiple integral keys. The power clamping of the column is controlled from the head of the machine.

Six integral keys are provided on the spindle, the latter having an adjustable counterbalance. A depth gage arranged to compensate for the drill point is supplied with the machine. The head is square-gibbed to the arm which is controlled by a single lever. The arm is supplied with a safety nut to sustain it in case the elevating nut should fail. A safety grip is also provided to prevent the dropping of the spindle in case the counterbalance chain should break.

The base of the machine is of box section. A single motor is required for driving the spindle, elevating the arm and for rapid power traversing. The motor is of the constant-speed type and can be supplied for either alternating or direct current. The standard equipment of the machine includes the power rapid traverse, power column clamping, cutting lubricant system and a box-type work table. The column-clamping device can be supplied for either electric or compressed air operation. A positive interlock is provided for the arm clamping and elevating, both of which are controlled by a single lever.

All driving power is taken from the arm shaft. One of the principles of the design has been to provide for easy and speedy operation, as exemplified by provisions for the control of speed and feed changes, arm locking and rapid traverse from the head and for the control of elevating and lowering of the arm.

—17—

Drill, Radial, Heavy-Duty

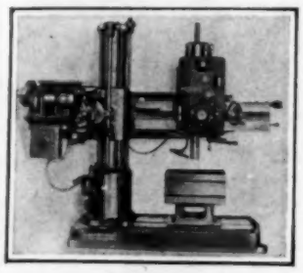
The Morris Machine Tool Co., Cincinnati, Ohio. [Vol. 65,p.804]

In the heavy-duty radial drills in 3-, 3½-, and 4-ft. sizes, the motor is mounted upon the arm. This construction balances the arm, places the motor out of the way of dirt and grit from the floor, and eliminates the mechanism necessary to transmit the power from a remote motor to the arm.

The entire feed unit is mounted in the head. There are six feeds on the 3- and 3½-ft. radial ranging from 0.005 to 0.030 in. per rev. of spindle. On the 4-ft. drill there are eight speeds ranging from 0.005 to 0.042 in.

per rev. of the spindle. In addition, on this size, there are four tap thread leads: 8, 11½, 14 and 18 threads per inch.

The tapping attachment and back gear bracket is a unit mounted on the back of the head. The clutches and the tapping units are of the multiple-disk type. The speed box is of the sliding



gear type mounted upon ball bearings. By means of a speed lever and speed chart the operator can quickly select any one of the spindle speeds. Power raising or lowering of the arm is controlled through a lever near the bottom of the column. This lever automatically unclamps the arm before the elevating or lowering gears are engaged. A further movement engages the gears and the arm is raised or lowered to its desired position.

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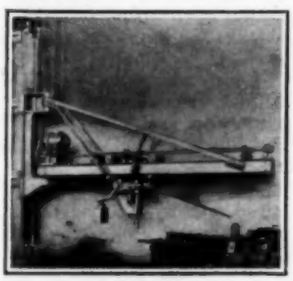
Drill, Radial, Wall, Heavy-Duty, No. 2

Wickes Bros., Saginaw, Mich. [Vol.65,p.1005]

The No. 2 heavy-duty wall radial drill has a number of improvements over former models. The drill is simple and sturdy in construction and is designed especially for use in boiler



shops and structural steel shops. It can also be used for countersinking, for enlarging punched holes, or for reaming holes. The power elevating device permits the raising and lowering of the boom for drilling deep holes, for drilling holes through both flanges of a deep structural section, or for drilling holes in odd-shaped, built-up section.

The mast is provided with a heavy cast-iron slide against which the boom rests. The elevating screw is driven by means of a 3-hp. motor through a worm and wormwheel. A vertical adjustment of 5 or 6 ft. can be provided, as desired. The boom is counterbalanced for ease in manipulation.

The drill can be provided for rigid attachment to the wall, in which case a simple mast is furnished, made of heavy structural sections, with brackets for attaching to the wall.

For hand feed, a long operating lever is provided with two points of leverage. The machine is also built with a power feed to the spindle. A quick-change feed box is provided, giving feeds of 0.006, 0.012, and 0.018 in. per rev. The machine has a capacity for drilling holes up to 1¼ in. in diam., or for reaming holes up to 2 in. in diam. The drill is made in five sizes of arm lengths ranging from 10 to 18 feet.

— 19 —

Drills, Radial, Traversing Bases for

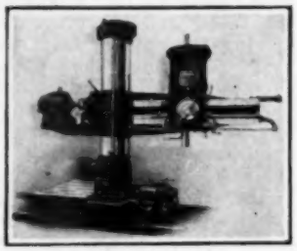
American Tool Works Co., Cincinnati, Ohio. [Vol.65, p.301]

Two types of traversing bases for radial drills are being made. In each case the standard American radial drill is used, and the traversing feature only is special. These bases were developed especially for use by boiler manufacturers and also in railroad boiler shops. For such work the boiler plates can be stacked and all of the drilling completed without resetting the work on the machine.

These traversing radial drills can be removed at any time from the traversing base and placed on a stationary floor plate, thus making a standard radial drill. All of the features of the standard machine are retained. The machine is built with 4-, 5-, 6-, 7-, 8- and 9-ft. arms, covering a wide range of work.

Both types of traversing drill can be furnished with either a pneumatic or an electric column clamp. When direct current is available, a 3-to-1 variable-speed motor is mounted on the arm.

With this type of drive, the machine can operate in a complete circle. In one type the traversing base travels along a standard-gage railroad track either by power



or by hand. When the unit is positioned for drilling the base is clamped to the track at four corners by means of a single lever.

The second type of traversing drill is also used for boiler plate work, and in addition it can be adapted to drilling, tapping, reaming, boring or stud-driving in large castings. The drill traverses along a heavy and substantial bedplate, on which one or more drilling units can be mounted. The drill is traversed in either direction by power. As in the case of the rail mounted units, the drilling machine proper is standard equipment.

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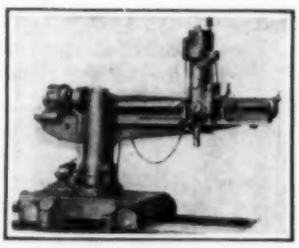
Drill, Radial, Plate and Rivet Hole, Heavy-Type

Cincinnati Bickford Tool Co., Cleveland, Ohio. [Vol. 65,p.219]

The heavy-type plate and rivet hole driller is designed for boiler, tank, and structural shops. The machine is a special type of radial drill having a base mounted on wheels and arranged for traveling under its own



power on a track parallel to the bench or trestle, on which the plates to be drilled are stacked. As many plates as the length of the twist drill will permit are stacked, and a plate from a previously drilled lot is used as a template.

The arm of the machine is of box-type construction heavily ribbed throughout, and an extension on the rear supports the driving motor. The arm can be furnished in 4-, 5-, 6- or 7-ft. lengths, according to requirements. The column is also ribbed and can be clamped either by hand, by an electric motor, or by a double-acting compressed air clamping device as supplied.

The head is fully inclosed and incorporates a selective sliding gear type of transmission for obtaining four changes of speed. Clutches are provided to permit the spindle to be started, stopped and reversed.

The base is of heavy construction. The wheels on which it is supported are mounted on roller bearings. Provision is made for locking the machine to the rails by means of four clamps operated simultaneously. A 2-hp. constant-speed motor furnishes power for propelling the machine on the track. It is controlled by a reversing drum-type controller. The machine can also be equipped with two types of stationary base, including a standard drill base with the usual T-slots.

The spindle of the standard machine is equipped with a No. 5 Morse taper and has 18 in. of travel. Its lowest position is 38 in. from the rail top and its highest position is 56 in. The maximum spindle radius with a 4-ft. arm is 4 ft. and with a 7-ft. arm is 8 ft. In all four models the minimum spindle radius is 20 in.

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Drills, Sensitive, Nos. 3 and 4

Fosdick Machine Tool Co., Cincinnati, Ohio. [Vol.65, p.428]

The above company has added to its line of drilling machines the Nos. 3 and 4 high-speed, ball-bearing sen-

sitive drills. The No. 4 machine is illustrated. The No. 3 bench type machine is built with one to four spindles, and the No. 4 pedestal type is supplied with one to six spindles. Both types of machine are built in 16- and 24-in. sizes, with capacity for drilling ¾-in. holes and for tapping ¼-in. holes.

All revolving parts of the machines are equipped with ball bearings mounted in dust-proof housings. The belt-driven machines are furnished with a tight and loose pulley, and a swiveling belt guard and automatic shifter. The drive is through spiral gears running in oil.

The table of the No. 4 machine is adjustable on the pedestal by means of telescopic screws and is controlled by the lever in front. The head is also adjustable on the column.

— 22 —

Drill, Sensitive, Model D, Demco

Merit Oil Equipment Co., Cleveland, Ohio. [Vol.65,p.580]

The Demco sensitive drill, known as Model D, is being marketed. In place of the usual sliding head, the vertical adjustment of the spindle

is obtained by means of a quill, which can be moved up or down and clamped in any position. The spindle is made of high-carbon steel and runs in ball bearings. It is counterbalanced by a coil spring which also keeps the ball races in contact with the balls and takes up lost motion due to the downward wear.

The machine is driven by two endless belts, one on the cone pulleys for changing the speed and the other for driving the spindle from the shaft carrying the upper cone pulley. This latter belt passes over a spring-tension idler, which automatically compensates for stretch in the belt.

The table slides on the column and is adjusted by means of a screw operated through a crank and bevel gears. The drills can be furnished in a floor type, as shown, or on a low base for bench use. In the latter type it can be furnished either in single or multiple spindles up to six.

— 23 —

Drilling Machine, Sensitive, Ball-Bearing

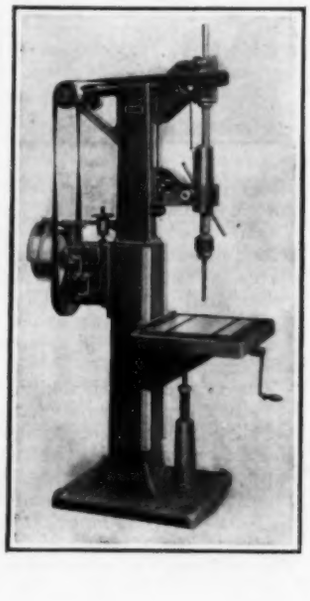
Berghausen Machine Co., 2128 Colerain Ave., Cincinnati, Ohio. [Vol.65,p.693]

The ball-bearing sensitive drilling machine accommodates drills up to ¾ in. in diam. and has nine spindle speeds ranging from 250 to 2,100 r.p.m. Fafnir ball bearings are used throughout except on the loose pulley, which rotates on a bronze bushing.

The tight-and-loose driving pulley and the gear box are in a single unit in guides on the rear of the column. Two levers are provided to shift the steel gears, and two alphabetical plates indicate the positions of the levers for each spindle speed.

The drill table can be raised or lowered by means of a telescoping screw. The finished table top measures 13½x14 in. A total vertical adjustment of 22 in. can be had.

The spindle is provided with a No. 2 Morse Taper.



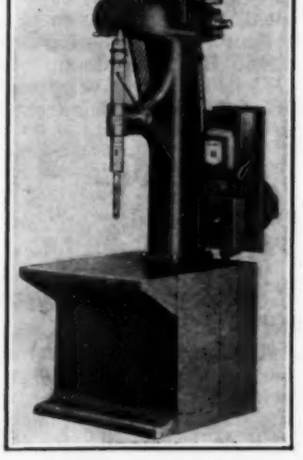
Its maximum distance from the table is 30 in., made possible by a vertical movement of the head of 7 in. The base of the drill measures 20x24 in. The machine weighs 635 pounds.

— 24 —

Drilling Machine, Sensitive, No. 3

Foote-Burt Co., Cleveland, Ohio. [Vol.65,p.812]

The No. 3 "Footburt" sensitive drilling machine has a capacity for drilling holes 1¼ in. in diam. in cast iron, or ¾ in. in diam. in steel. It has many of the features of the smaller capacity sensitive drilling machine made by this company, such as the quick change speed ar-



rangement, a simple drive, and automatic idlers.

The machine is designed to be set up for one particular type of job, although it is possible to use various types of jigs on the box-type table. The distance from the spindle nose to the top of the table can be set to suit requirements, and a filler block can be placed under the upright to increase this distance.

An important feature of this machine is the design of the cabinet base, which is arranged so that two or more machines can be bolted together to form a gang machine, with a distance of 15 in. between the spindle centers. The interconnected machines can be arranged for a single drive.

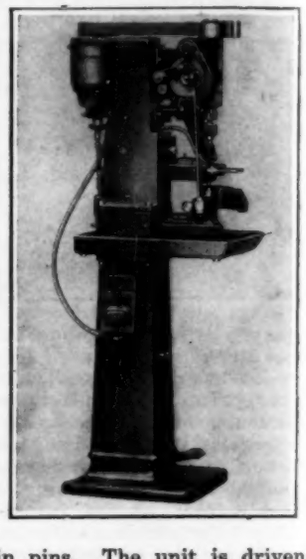
The machine can be arranged for either belt or motor drive. Roller bearings are used throughout the unit. It is possible to equip the machine with automatic power feed.

— 25 —

Drilling Machine, Semi-Automatic

Kingsbury Machine Co., Keene, N. H. [Vol.65,p.508]

The semi-automatic drilling machine incorporates this company's standard drilling head and a burring attachment for finishing holes



in pins. The unit is driven by means of a ball-bearing vertical motor mounted on the rear of the column. Interchangeable pulleys are supplied to give spindle speeds up to 7,000 r.p.m. with a 3,500-r.p.m. motor.

The drill spindle has a constant-pressure feed, regulated by means of a knurled adjusting screw and actuated through friction gearing. The spindle is advanced rapidly to drilling position and when resistance is encountered the gears begin to slip. The rate of feed varies as the resistance on the drill.

An automatic clamping attachment is provided, together with adjustable V-blocks for holding work up to ¾ in. in diam. The work is automatically clamped, drilled, countersunk on the bottom of the hole to remove the burr, unclamped, and ejected.

A tank and pump are located within the pedestal for supplying coolant to the drill.

— 26 —

Drilling Machine, Mud-Ring and Flue-Sheet

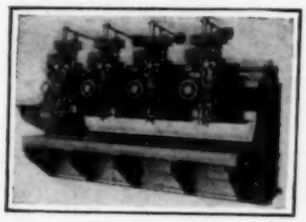
Foote-Burt Co., Cleveland, Ohio. [Vol.65,p.577]

The No. 3 mud-ring and flue-sheet drilling machine is regularly equipped with four of this company's No. 30 head. It was designed to

drill the rivet holes around the fire box mud rings and the flue holes in boiler flue sheets for use in the larger types of modern locomotives. In order to make possible the drilling of large flue sheets in one setting, the table has a long travel and the spindles can be adjusted back and forth as well as in and out. The spindles overhang the finished edge of the base, so that mud rings can be bolted to this finished edge by means of three T-slots running horizontally. The table is supported by five knees, the three middle ones being adjustable.

The machine is so arranged that a pit can be placed in the floor flush with the front finished edge of the base to permit the mud ring to project down into the pit.

The machine can be arranged for either belt or motor drive. The power is transmitted through a heavy horizontal shaft where it is distributed to the heads by means of bevel gears. Each head is equipped with three



quick feed changes independent of each other. The heads are adjustable along the rail, the minimum center distance being 24 in. while the maximum distance between the two outside spindles is 123 in. The in and out spindle adjustment is 18 in. Each spindle has a drilling capacity of 3¼ in. in steel or 7 in. using a trepanning tool.

The table has a working surface of 75x144 in. and has an in and out adjustment of 60 in. The unit weighs about 40,000 pounds.

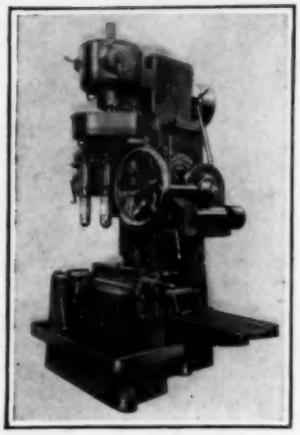
— 27 —

Drilling Machine, Rail-, Newton

Consolidated Machine Tool Corp. of America, Newton Works, Rochester, N. Y. [Vol.65,p.186]

This rail-drilling machine has been built especially for rail shops and is simple in design and operation. The machine is fitted with three hardened steel spindles that are adjustable on a vertical saddle. The range of center distance between the two outside spindles is 12 to 24 in. The spindles are fitted with ball thrust bearings and are driven by large-pitch, wide-faced gears.

The speed box and driving head are contained in a



single unit. Speed changes are effected through triple sliding gears. The change gears have stub teeth and are made of heat-treated steel.

The final feed drive to the spindle is through a rack and pinion inside the column. At the end of the drilling operation the feed is knocked out by means of a rod with an adjustable collar that comes in contact with the feed trip on the saddle.

The work table is made integral with the column and is provided with T-slots for clamping the rails. A squaring block, a clamping screw at the front of the table, and a stop screw at the right hand end are provided. A motor bracket is bolted to the side of the column and is provided with screws for adjusting the motor rails.

— 28 —

Drilling Machine, Deep-Hole

Hoefer Manufacturing Co., Freeport, Ill. [Vol.65,p.470]

This machine was designed for the drilling of holes 2⅝ in. in diam. in cast bronze ingots 40 in. in length. The machine consists primarily of a base, a column, a two-spindle head, and a rotating trunion with work holding fixtures. While the machine was built for a specific purpose, it can readily be adapted for any kind of deep drilling requiring equipment of this size.

The base is deep and is heavily ribbed. The column is also of heavy section with cross ribs. The two-spindle head is of sturdy construction. The spindles are mounted in Non-Gran bronze bushings and are equipped with No. 4 Morse tapers. The drilling thrust is taken upon ball bearings. All gears within the head are made of heat-treated alloy steel.

The length of the work stroke is determined by two adjustable collars on the trip rod. The feed can be started, stopped or reversed at will by the operator, but if once started it will reverse automatically at the end of the

down stroke and will stop automatically at the end of the rapid return stroke. A large hand wheel is provided at the right of the machine for operating the head by hand.

The rotating trunion contains four work-holding fixtures, consisting in each case of four hardened steel Vs. Two tubes are bored simultaneously while the operator removes the two finished pieces and inserts two new ones.

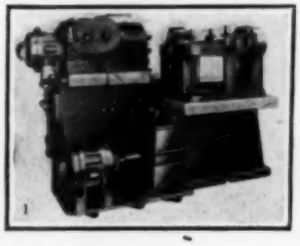
An ample supply of coolant is furnished by means of a geared pump. The machine occupies a floor space of 40x98 in. It weighs approximately 16,000 pounds.

— 29 —

Drilling and Boring Machine, Horizontal

The Rockford Drilling Machine Co., Rockford, Ill. [Vol.65,p.731]

The drilling and boring machine is for high production work, and has been de-



signed with the idea of simplicity and a minimum of working parts. All drive gear boxes on the base of the machine have been eliminated and the motor drives direct to the head through a worm and gear unit. Both a single- and a double-speed machine is made. Forward and reverse rotations for such operations as tapping can be obtained by merely adding one more gear to the train.

The front part of the head contains the spindle unit, and it can be removed or replaced by another at any time. Almost any combination and number of spindles required can be arranged, provided that the centers are not so close as to reduce the spindles and gears below the size necessary to take the load.

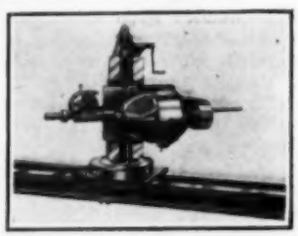
The entire head carrying the drive and the spindle unit is fed on ways on the base of the machine, and can be arranged to be either hand or automatically controlled. This type of head can be mounted on either horizontal base, on a vertical column, or on angular columns. Combined horizontal and vertical heads can be obtained. The machine is made in several sizes.

— 30 —

Drilling Machine, Horizontal, Special-Purpose

The Hoefer Manufacturing Co., Inc., Freeport, Ill. [Vol. 65,p.734]

The special purpose horizontal drilling machine is for use in drilling the oil holes



through the throws of large and heavy crank shafts.

The bed is long enough to give ample horizontal travel to the column to reach the full length of the crank shaft at one setting. The head of the machine is bolted to the floor plate by means of three ears, one on each side. On the base is mounted a rack running the full length, and by means of a handwheel, the column can be easily and quickly moved to any desired position. The entire upper

unit can be turned and clamped to drill oil holes at any angle.

The head has a vertical adjustment of 12 in. on the column, and its travel is controlled by a crank. The length of the bed can be varied to suit any length of shafting being drilled.

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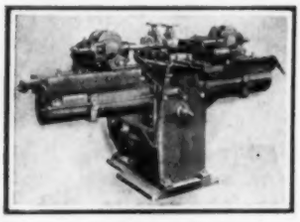
Drilling Machine, Horizontal, Piston, Duplex, No. 19 "Hole Hog"

Moline Tool Co., Moline, Ill. [Vol.65,p.885]

The "Hole Hog" No. 19 horizontal duplex piston-drilling machine has been built with four standard heads and a jig for drilling wrist pin holes in pistons.

The machine consists of a pedestal to which two side members are bolted, thus forming a long bed, running longitudinally through the center of which is mounted a large shaft. On this shaft are carried two drum cams shaped to give the desired



traverse to two slides, one on each end of the bed. The slides are constructed to carry standard drilling heads driven through spiral gearing. Both slides feed in simultaneously and the cams are designed to give a complete cycle consisting of quick approach, slow feed and quick return to the drills.

The jig is designed to carry four pistons, two being drilled at one time, while two are being loaded. The time for a complete cycle is 45 seconds.

The machine occupies a floor space of 8 ft., 8 in. by 4 ft. 8 in. The approximate shipping weight is 5,000 pounds.

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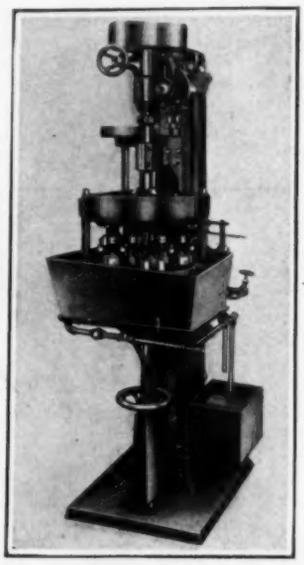
Drilling and Tapping Machine, Multiple, Special-Purpose

Hoefer Manufacturing Co., Freeport, Ill. [Vol.65,p.572]

This multiple drilling and tapping machine was built for the drilling of six holes located in a lock spindle of an ordinary door lock, with centers only ¼ in. apart. The drilling unit as a whole consists of a special type high-speed, ball-bearing sensitive



drilling machine with an automatic feed mechanism, a twelve-spindle adjustable auxiliary head, and an automatic indexing jig.

The machine has the general features usually found on sensitive drills, including the base, table, elevating device, and belt tightener and countershaft and in addition it has two supports under the idler pulley carrier to give greater rigidity to counteract the greater pressure of the 12 drills in the auixiliary head.

The quill support or bearing is cast solid with the head. This construction provides a more compact mounting for the feed mechanism. The feed is controlled by a cam of the ordinary built-up type, providing rapid approach, feed, quick return and then dwell. The automatically indexing jig consists of a hollow base in which is located the gears and the Geneva Movement. The indexing table carries four fixtures, each carrying two lock spindles. A guide bushing plate having guide bushings for each drill is carried on the head.

The tapping machine is identical with the drilling machine, except that it has in addition the tap reversing mechanism within the head and a cam of slightly different profile. The cam is such that the taps are started with the proper leads, but slow down somewhat to allow the taps to float in advance of the head.

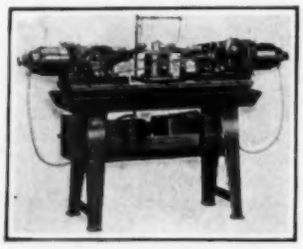
— 33 —

Drilling and Tapping Machine, Type EB

Kingsbury Machine Co., Keene, N. H. [Vol.65,p.306]

The Type EB universal double-end drilling and tapping machine consists of this company's No. 18 motor-driven drilling head and its No. 14 tapping head with built-in reversing clutch mounted upon a base with its No. 75 automatic indexing fixture between the tools. This particular machine was designed to drill and tap holes in the shanks of door knobs, but it is applicable to any small drilling and tapping work of a like nature.

In these heads the motors drive the spindles through suitable speed reducing gears, while the feed motion is obtained by a cam. The feed of the tapping head merely brings the tap forward to enter the work, after which the rate of advance is governed by the lead of the tap. The machine is automatic in its



action, the operator placing the work in the holding fixtures as each is presented to the loading position and unloading the finished pieces.

The motor controls are located within easy reach of the operator. The machine is equipped with a motor-driven circulating pump and reservoir to supply oil or cutting compound to the tools. The floor space covered is approximately 2½x7 feet.

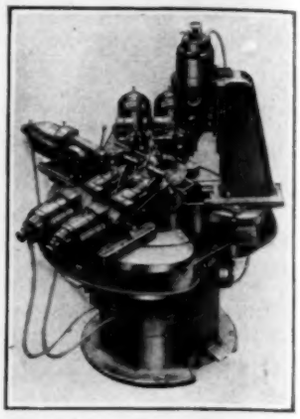
— 34 —

Drilling Machine, Type G-A

Kingsbury Machine Co., Keene, N. H. [Vol.65,p.343]

The Type G-A drilling machine consists of a standard base with a flat, circular top upon which any number not exceeding six of the Kingsbury No. 18 motor-driven drilling heads may be mounted. It is designed for the production drilling and tapping of small parts in which the several holes must be accurately positioned relative to each other.

The No. 18 drilling head is



in itself a complete unit with driving motor, automatic variable feed, and clamping attachment to hold the work. The spindle may be fitted with a drill chuck to carry a drill, or with a standard tapping attachment. These heads may be clamped to the base of this machine at any desired angle in the horizontal plane, or by means of special supporting heads in any plane.

The pieces to be drilled are held by special fixtures upon an indexing turret that is rotated about a vertical axis by hand. A trip lever starts the feed movement of all heads simultaneously. The operator's duties are confined to loading the fixtures, indexing the turret and tripping the starting lever.

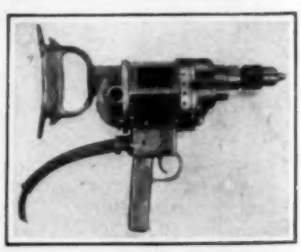
The maximum drill size is ⅜ in. and the maximum range of feed movement is 1½ in. The floor space occupied is 4½x5½ feet.

— 35 —

Drill, Electric, Portable, Heavy-Duty, ½-Inch

Black & Decker Manufacturing Co., Towson, Md. [Vol. 64,p.38]

The heavy-duty, portable electric drill illustrated does not replace the ½-in. light-duty model made by this



company and described on p. 672, Vol. 59, of the *American Machinist*, but supplements it.

The drill is equipped with a three-jaw, hand-tightening chuck for use with straight shank drill bits. The machine

is equipped with 15 ft. of duplex electric cable and a separable attachment plug. The no-load speed is 1,400 r.p.m., and the weight is 10½ lb. Models can be had for service on 32-, 110-, 220- or 250-volt circuits.

— 36 —

Drill, Electric, Universal, "Little Giant," ¼-Inch

Chicago Pneumatic Tool Co., 6 East 44th St., New York, N. Y. [Vol.65,p.430]

The No. 25-B "Little Giant" universal electric drill has a capacity of ¼ in. The handle of the tool is the pistol-grip type and is provided with a thumb-operated push-button plunger switch. The cable

enters at the base of the handle and is protected by means of a pliable rubber case.

The motor is of the universal type and ball bearings are used throughout. The gears are made of chrome-nickel steel, heat-treated. The switch, motor, and gear housings are made of special alloy of high tensile strength, and the design of the housings is such that the commutator and brushes may be inspected while the motor is running.

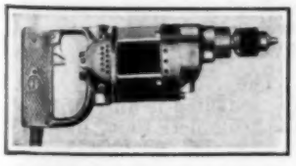
The over-all length of the tool is 12¾ in. and the net weight 6½ lb. The full load speed of the unit is 1,280 r.p.m. Regular equipment includes 10 ft. of cable, a connector, and a 3-jaw adjustable chuck.

— 37 —

Drill, Electric, Ball-Bearing, ¼-Inch

Black & Decker Manufacturing Co., Towson, Md. [Vol. 65,p.618]

This improved ¼-in. ball-bearing electric drill is intended to replace the light ¼-in. drill made by this company. The drill is provided with an improved universal motor that drives the chuck



through a double-reduction gear unit. All rotating shafts are mounted upon ball bearings.

The drill is equipped with a Jacobs three-jaw geared chuck. It is also provided with 7½ ft. of duplex electric cable fitted with an attachment plug and a rubber cord protector where the cable enters the switch. The tool has a capacity in steel of drilling holes up to ¼ in. in diam. The unit weighs 5 pounds.

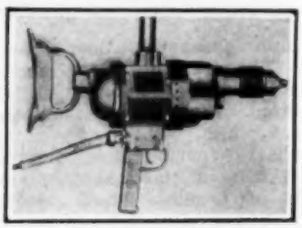
— 38 —

Drill, Electric, Portable, 5/8-In.

Black & Decker Manufacturing Co., Towson, Md. [Vol. 65,p.693]

The portable electric drill is designed to drill holes up to ⅝ in. in diam. in steel or up to 2 in. in diam. in wood. The unit can also be used with spring-expanded cylinder hones or positive-set hones.

The motor is of the universal type. Norma ball bearings are used on the armature shaft, and the outer races are fitted into steel inserts cast integral with the aluminum field case and the



gear cover which form the housings for the motor. Carbon brushes are carried in die cast brush holders mounted on a fibre ring. This ring will not be disturbed when the brushes are removed.

Ventilation of the motor is accomplished by means of an aluminum fan on the armature shaft.

All gears are made of carbon steel, heat-treated. Bearings for the intermediate gear shaft and the spindle are made of special phosphor bronze, but thrust of the drill is taken on a ball thrust bearing.

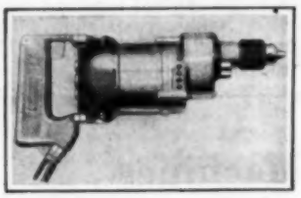
The spindle carries a standard 3-jaw geared chuck mounted on a slight taper. The motor is rated at ¼ hp. with a no-load armature speed of approximately 13,500 r.p.m., and a no-load spindle speed of 400 r.p.m. Regularly supplied with the unit are 15 ft. of cable, an attachment plug, and detachable side handles. The unit weighs 17½ pounds.

— 39 —

Drills, Electric, Portable, ¼- and 5/16-Inch

Van Dorn Electric Tool Co., Cleveland, Ohio. [Vol. 65,p.850]

The improved sizes of portable electric drills, ¼- and 5/16-in., are equipped with ball bearings throughout, and are



more heavily powered than previous models. Each drill has a trigger switch that shuts off when the finger pressure is removed. An improved form of cable attachment is also used.

The smaller tool has a no-load spindle speed of 2,000 r.p.m. and a full-load speed of 1,200 r.p.m. The drill weights 5½ lb. and its over-all length is 11¼ inches.

The larger drill has a no-load speed of 1,500 r.p.m., and a full-load speed of 900 r.p.m. This size weighs 7 lb. and measures 12½ in. over all. A 3-jaw chuck is provided for both sizes.

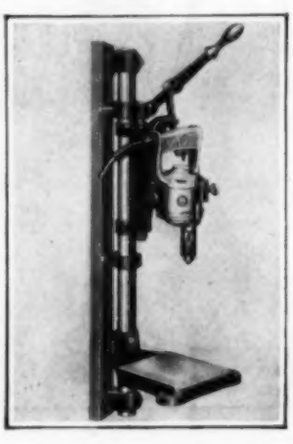
— 40 —

Wall Bracket, Drill, Type Q

United States Electrical Tool Co., Cincinnati, Ohio. [Vol.65,p.694]

The Type Q wall bracket illustrated is designed for attachment to the wall where bench space is limited.

The bracket is designed to take care of the ¼- and 5/16-in. portable electric drills made by this company. The vise-like grip mechanism eliminates the use of special adapters. The drill may be raised



or lowered or swung around on the vertical column. It is secured in any desired position by adjustment of the clamping screws. The drill is supported by an inclosed spring.

— 41 —

Drilling Heads, Multiple-Spindle, Adjustable

The Sellew Machine Tool Co., Pawtucket, R. I. [Vol. 65,p.849]

The multiple-spindle drilling heads are for use on standard drill presses. An eight-spindle device is intended for drilling small, closely-spaced holes in the angular surfaces of gas

burners. The head clamps to the quill of the drill press, and the mechanism is driven by a tapered shank. The drive is through a central gear that meshes, through intermediates, with a spiral gear on each small spindle.

The small heads are independent, and one may be adjusted or removed from the device without interfering with the others. The angle is fixed, but the device can be furnished with the spindles at any angle from 15 to 45 degrees.

The 4-spindle head is designed to drill four equidistantly spaced small holes in a circle, the diameter of which may be changed within a limited range. It is particularly adapted to the drilling of holes in motor frames.

— 42 —

Drill Table, Indexing

Hoefer Manufacturing Co., Freeport, Ill. [Vol.65,p.1045]

This standard indexing table and base is for use with any of this company's line of drillers, special drilling machines, and multiple-spindle heads. It is claimed that by combining this table with an auxiliary head, loading can take place in one position, drilling in another, counterboring in a third, and so on.

The unit can be bolted to the base of any drilling machine. Mounted on a large square base is the top plate, which is the sub-base for the indexing table. The index locking plunger, which is designed for foot operation, is a hardened and ground taper and engages hardened and ground bushings, accurately spaced around the underside of the indexing table.

The table itself is flat finished so that any number of different fixtures can easily be attached. It is carried on a large central locating stud. The table rests on roller bearings spaced around the top of the sub-base.

Grinding Machines

—43—

Grinder, Disk, Horizontal, 30-Inch, No. 86

Gardner Machine Co., Beloit, Wis. [Vol.65,p.37]

The No. 86 horizontal disk grinding machine carries a 30-in. steel disk wheel mounted on a vertical spindle. The standard 53-in. machine made by this company was described previously on page 1064, Vol. 63 of the *American Machinist.*

The disk wheel is mounted on a heavy supporting flange 16 in. in diam., which is

keyed to the taper end of the vertical drilling spindle. The spindle is ground to size, crucible steel, and is mounted on oversize radial and thrust ball bearings lubricated by oil.

The spindle carries a pulley from which a belt passes over two adjustable ball bearing mule pulleys. A standard dressing device is provided for truing the grinding wheel.

The No. 86 machine can also be provided with a motor drive for alternating current. The motor used is of the vertical type mounted in the base of the machine, the shaft serving as the machine spindle. It is fully inclosed and ventilated. The floor space occupied by the machine is 46 x 38 in. and the weight is approximately 1,550 pounds.

—44—

Grinder, Disk, Type D-3

Porter-Cable Machine Co., Syracuse, N. Y. [Vol.65, p.615]

The 15-in., motor-driven, horizontal disk grinder illustrated is intended for burring small parts after milling, stamping or turning. The machine can also be used for removing surplus metal for fitting operations in the assembling department. It can be employed on production work with girls or inexperienced help. The speed of the operation is limited only by the speed of the operator.

The Type D-3 machine does not require bolting to the floor, and is readily portable. The motor is operated by connecting to any lamp socket.

The frame, base, pedestal,

and housing of the machine are of cast iron of great enough proportions to insure rigidity and strength. The 15-in. disk is 40 in. from the floor, and the machine can be built into a work bench for convenience of production. The overall floor space is 20x22 in. Two disks are furnished for convenience in changing the abrasive.

—45—

Grinding Machine, Disk, Vertical, No. 79-72-Inch

Gardner Machine Co., Beloit, Wis. [Vol.65,p.933]

The No. 79-72-in. vertical disk grinder is for surface operations of especially large area. It differs from the standard 72-in. Gardner disk grinder in two main features: It is designed for either wet or dry grinding, and it contains a direct-connected vertical motor which makes a compact, self-contained machine requiring a mini-

mum amount of floor space.

The machine carries a steel disk wheel 72 in. in diam. traveling in a horizontal plane. The motor rotor shaft forms the driving spindle of the machine, and is of crucible steel. It is mounted on radial and thrust ball bearings. The motor frame serves as the machine pedestal.

The push-button control is mounted on any point on the base preferable to the demands of convenience. A rigid horizontal bar dressing device is provided with the machine. A special pneumatic press is also furnished with the machine.

The reservoir has a capacity for 75 gal. of cutting compound, and is provided with hand holes for cleaning out the sludge. The floor space occupied by the machine is a circle 7 ft. in diam. The standard motor furnished is for alternating current.

—46—

Grinder, Disk, No. 88-18-Inch

Gardner Machine Co., Beloit, Wis. [Vol.65,p.1082]

The No. 88-18-in. disk grinder with vertical motor, was developed to handle numerous grinding operations on flat surfaces of relatively small area, where the ground portion is not required to have an accurate relation to any other portion of the casting. The machine is regularly furnished with an a.c. motor controlled by

means of a push-button station mounted in any convenient position on the base.

The motor frame itself serves as the machine base. In the standard type illustrated, the distance from the floor to the grinding member is 22½ in., so that the operator can sit while at work.

A steel disk 18 in. in diam. travels in a horizontal plane. This wheel is supported on the rotor shaft, which forms the driving spindle of the machine. It is supported on ball bearings of the deep-grooved type, the lower bearings carrying both radial and thrust loads. The bearings are carefully protected from dirt and grit and are provided with suitable oil level pipes. A 5-hp. motor rotating at 1,800 r.p.m. is regularly furnished.

A cast-iron guard ring is fastened to the top of the base. To it may be secured work holders, dressing device, etc. A dust channel of ample size with a connection for an exhaust pipe is placed around the wheel. Wet grinding can be performed when a separate source of water supply is available.

A rigid horizontal bar dressing device is supplied. A sliding block carrying dresser cutters is forced back and forth across the abrasive disk by hand. The machine occupies a floor space 25 in. in diameter.

—47—

Grinding Machine, Surface, No. 2

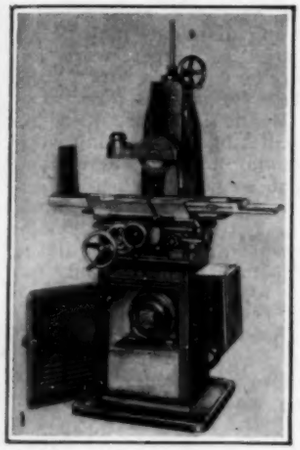
Brown & Sharpe Manufacturing Co., Providence, R. I. [Vol.65,p.727]

The No. 2 surface grinding machine is an addition to the "complete unit" line. The

motor is inclosed within the base for protection from oil, water, dust, dirt and other sources of trouble to which outside motors are subjected.

The motor is of the constant-speed type and is mounted on a plate which is bolted to a shelf in an oil-tight compartment in the machine base. Ventilators cast in the door provide circulation of air for cooling. Additional space is furnished under the motor shelf for storage of machine accessories.

The power is transmitted by means of a belt running over a system of pulleys. Push-button control is provided in the operating position. Longitudinal table travel and traverse move-



ments are automatic, and an automatic stop throws out the feed at any point. When only the longitudinal feed is wanted, the power cross feed can be disengaged.

Work up to 18 in. in length, 6 in. in width, and 9½ in. in height can be accommodated with a wheel 7 in. in diam. The machine requires a floor space of 65x30 in., and its net weight without the motor is 1,350 pounds.

— 48 —

Grinder, Surface, with Magnetic Chuck, "Hanchett"

The Machinery Company of America, Big Rapids, Mich. [Vol.65,p.732]

The "Hanchett" surface grinder has been equipped with a Walker magnetic chuck. The machine is designed for grinding locomotive guide bars, shear blades, or any general surfacing or edge grinding. The sizes of grinder listed are from 84 to 192 in., with width of grind up to 12 in., but machines of

larger capacities are built on order.

One of the features of the machine is the traveling wheel and stationary work table. With this arrangement the machine is required to be only slightly longer than the work, and it is claimed that only half of the floor space is required that is taken up by a machine with a traveling work table. The shorter length of design permits a more massive type of construction. It is claimed that with the work held on a stationary and rigid table a greater accuracy in grinding is obtained. It is also maintained that the machine with traveling wheel requires considerably less power for operation than the type with traveling table.

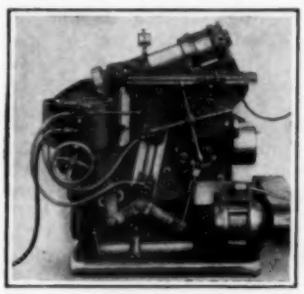
The grinders are equipped with 24-in. or 30-in. wheels with abrasive segments. A wheel truing device is fastened to the upper wheel guard of the machine so that the wheel can be trued easily while grinding. The machine is equipped with an automatic feed control.

— 49 —

Lift, Pneumatic, Workspindle, Surface-Grinder

Heald Machine Co., Worcester, Mass. [Vol.65,p.813]

An added feature to the Heald rotary surface grinding machines is the pneumatic lift, by which the



workspindle may be raised vertically through a controlled distance.

The movement is made by the application of compressed air. The piston of the inclined cylinder is connected directly to the knuckle of a pair of toggle levers that act through the medium of a bell-crank to raise the work-carrying head.

A maximum lift of 2 in. at the chuck is available. Attached to the lever at the right is a connection by means of which the rotative movement of the chuck and the reciprocations of the ram are started and stopped. The operator has only to load the chuck and manipulate the air valve. The pneumatic lift does not, however, interfere in any way with the vertical adjustments that may be made with the handwheel.

A further feature of the machine is the inclined auxiliary slide mounted upon the main ram in which the wheel spindle is carried. Because of the angular relation of the wheel spindle to the axis of the work it is possible to present the grinding wheel in such manner that the cut may be carried to the junction of a plane with a cylindrical surface.

— 50 —

Grinder, Face, Double-Head, Heavy-Duty

Springfield Manufacturing Co., Bridgeport, Conn. [Vol. 65,p.74]

This heavy-duty double-head face grinder is designed for the simultaneous grinding of two opposite sides of castings. The reciprocating table has a working length of 84 in. and a working width of 36 in. between the grinding wheels. Specially designed 30-in. sectional chucks will take standard shapes of abrasive blocks, either silicate or vitrified. The chuck jaws are a floating type, and each jaw is provided with a screw device for feeding the blocks forward as they become worn. No blocking pieces are needed for keeping the abrasive segments in the proper cutting position. The adjusting mechanism is completely protected from water and abrasive.

Each grinding spindle is driven by a 40-hp. motor connected to the spindle by means of a silent chain. The spindle bearings are lubricated by large sight-feed oilers to insure a constant and ample supply of clean oil. The wheel heads can be operated singly or can be locked together by a positive locking arrangement. The table drive is by means of

rack and gear train and a 3-hp. motor furnishes the power for driving the table and the coolant pump. The machine is fitted with a complete equipment of water guards. The weight of the machine is 23,000 pounds.

— 51 —

Grinder, Face, Large-Size

Diamond Machine Co., Providence, R. I. [Vol.65, p.426]

This is claimed to be one of the largest and heaviest grinders ever produced. It is designed primarily for grinding railroad frogs, but can be used for any similar work where the grinding of flat surfaces is required. It is claimed that the time for grinding a frog with this machine has been reduced to 30 min. The machine handles work up to 198 in. in length and up to 42 in. in height.

The bed is 336 in. in length, and has a three-point bearing on the floor. The table is carried on the bed on a 90-deg. V at the front and a flat way at the rear. The platen measures 200x36 in. and has seven T-slots for use with ¾-in. bolts. The table

can be traversed by either hand or power and is controlled from both the front and the rear of the machine.

The wheel chuck holds 24 abrasive blocks, adjustable for wear and more than 5 in. of the depth can be removed before the block needs to be removed. The ball thrust bearings are used to take the grinding thrust. The wheel head may be fed by hand from either the front or the rear of the machine. Automatic cross-feed controlled from the rear has a range from 0.001 in. to ½ inch.

The machine is driven by means of a 75-hp. motor through a sprocket and a silent chain. The coolant pump is also motor driven and it provides 100 gal. of water per min. to the wheels.

— 52 —

Grinder, Face, Horizontal, Double-Spindle, No. 224

Badger Tool Co., Beloit Wis. [Vol.65,p.615]

This company has added an Oilgear table feed to its No. 224 double-spindle hori-

zontal grinder. The mechanical feed machine was described on page 38, Vol. 63, of the *American Machinist*.

As regularly furnished, the table makes 4 cycles per min. It moves in to grind, back to the outside edge of the wheels, in to the center to regrind and all the way out to eject the piece automatically.

The cycles can be varied by changing the cam operating the Oilgear valves to obtain strokes ranging up to 20 in. When changes in the gear train are made, 20 cycles per min. can be obtained.

The Oilgear pump is driven by the same motor that operates the cam gears and the valve operated by the cam controls the cylinder valves. A supplementary valve operated by a stop on the table idles the machine a moment in order to give the operator time to insert a new piece in the fixture. A safety valve stops the machine in case a piece is inserted crooked, in order to prevent breakage of any part of the feed mechanism.

Coolant is supplied to the wheel through a "Fulflo" water pump driven from a pulley on the Oilgear pump shaft. A wheel dresser is provided on the back of the machine.

Either 24- or 30-in. disk wheels may be used and the spindles are connected to standard 20-hp. motors through sliding couplings, as in previous models.

— 53 —

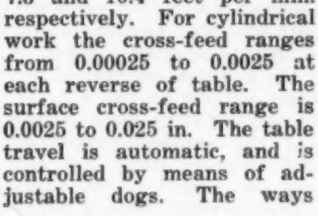
Grinding Machine, Universal, Motor-Driven, Nos. 2 S.C. and 2½ S.C., "Bath"

Universal Grinding Machine Co., Fitchburg, Mass. [Vol.65,p.809]

The "Bath" No. 2 S.C. and 2½ S.C. motor-driven universal grinding machines can be moved about as a unit and have all the features of the over-head belt-driven machine without its drawbacks. A single motor drives both the wheelspindle and the table traverse.

Three spindle speeds are provided, 1,850, 2,300 and 2,800 r.p.m. The carriage carrying the spindle has a vertical movement of 7½ in., and the elevating screw is provided with a micrometer reading handwheel graduated to thousandths of an inch. The standard wheel size is 12 in. in diam. and 1½ in. in face. For internal work the spindle has speeds of 9,000, 11,500, and 14,000 revolutions per minute.

Five speeds of table traverse are provided for both cylindrical and internal grinding work of 2, 3.7, 5.2, 7.3 and 10.4 feet per min. respectively. For cylindrical work the cross-feed ranges from 0.00025 to 0.0025 at each reverse of table. The surface cross-feed range is 0.0025 to 0.025 in. The table travel is automatic, and is controlled by means of adjustable dogs. The ways



have large wearing surfaces on which the oil is distributed evenly by rolls and grooves. For taper grinding the table swivels on a central stud.

A 3-hp. motor running at 1,725 r.p.m. furnishes the main drive for the spindle and the table. The headstock is driven by a separate ¼-hp. motor built into the head. Coolant is supplied by means of a tank and pump attached to the rear of the machine. The No. 2 S.C. machine occupies floor space of 114 x 114 in. and weighs 4,640 lb. net, while the No. 2½ machine occupies a floor space of 134 x 134 in. and weighs 4,920 lb. net.

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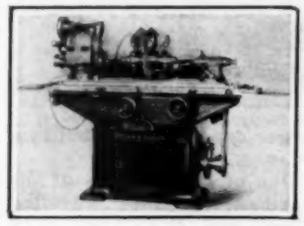
Grinding Machine, Universal, Motor-Driven

Brown & Sharpe Manufacturing Co., Providence, R. I. [Vol.65,p.886]

Complete motor-equipped universal grinding machines in sizes Nos. 2, 3 and 4 are being made. They are completely self-contained units.

Power for the headstock drive, the wheelspindle drive and the table feed drive on each machine is supplied by three individual electric motors. These motors are controlled by a single push-button switch. The work-driving motor, mounted on the headstock, is compactly designed and by means of pulleys and idlers drives the work on either live or dead centers.



The wheelspindle driving motor is rigidly mounted on a wheel stand which is bolted to the wheel-stand platen. The drive is direct from the motor pulley to the spindle pulley except where an internal grinding attachment is used, in which case the spindle is replaced by a countershaft. The motor that provides power for the automatic table travel and cross feed is located at the rear of the machine. This motor also drives the pump for supplying water for wet grinding.

Several types of constant-speed motors and various styles of control equipment are offered for use with both direct and alternating current to suit the requirements of the user.

— 55 —

Grinder, Centerless, "Heim," Improved

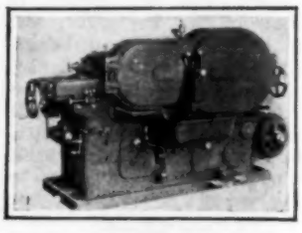
Cincinnati Grinders Incorporated, Cincinnati, Ohio. [Vol.65,p.421]

The chief feature of the improved "Heim" centerless grinder is the use of an hydraulic control for the regulating wheel slide. This control is used in spot or in-feed grinding. There is also an hydraulic control for the truing diamonds, by means of which the diamonds may be fed uniformly at a fast rate across the wheels or with an almost imperceptible movement. Other improvements embodied in the machine include Texrope drives to both the regulating wheel and the grinding wheel, a quick-change gear box, visible settings and simple adjustments. The machine is of greater capacity than previous models and will accommodate work ranging from ⅓ to 6 in. in diameter. In through-pass grinding, bars of any length can be handled and an in-feed or spot grinding, work up to 8 in. under the head can be ground. A 15-hp. motor, mounted on the right-hand end of the base drives the machine by means of a silent chain.

By means of a simple valve adjustment, strokes of various lengths, either 2, 3, 5, 9, 15 or 25 reciprocations per minute are obtainable. There are seven regulating wheel speeds, including the truing speed, of 8, 13, 21, 37, 62, 100 and 740 r.p.m. In in-feed or spot grinding, the cam that controls the hydraulic system is a slow feed to the regulating wheel slide until the wheel reaches the necessary position for grinding to the required diameter. Then the wheel dwells for a short period in that position and is finally given a quick return to the starting position.

The diamond truing devices are reciprocated automatically across the faces of the wheels also by means of the hydraulic system. The truing diamonds may be adjusted for taper work and may be equipped with a guide plate for special form work.

Means are provided for oscillating the grinding wheel spindle a slight amount in spot grinding when an extremely fine finish is required. The position of the grinding wheel and the regulating wheel can be closely adjusted by means of a hand wheel at the outer end of their respective slides, to thousandths of an inch. On this improved machine the grinding wheel is 24 in. in diam. and the regulating wheel 14 in. The sleeves and flanges are designed to take care of wheels of any face up to and including 8 inches. The spindle of the regulating wheel can be swiveled from one degree above horizontal to six



degrees below in order to change the rate at which the work is fed across the grinding wheel. When the machine is used to grind long bars outboard supports are furnished to supplement the work-holding fixture.

— 56 —

Grinding Machine, Tool, Universal, Improved

Norton Co., Worcester, Mass. [Vol.65,p.883]

The universal tool and cutter grinding machine shown in the accompanying illustra-

tion has been redesigned. Individual motor drive has been adapted for each operating unit, by building the motor directly into that unit.

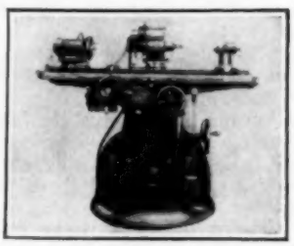
Three motors provide power for the various drives. The double-end wheel spindle is driven by a ½-hp. constant-speed motor arranged on a platform in the base of the machine. This platform is attached to the wheel column holding the motor in the same relation to the wheel spindle at all times. The hollow column through which the belt passes also affords a complete protective guard.

The headstock is equipped with a 1/20-hp. adjustable-speed direct-current motor that provides a range of work speeds from approximately 200 to 350 r.p.m. A push-button switch is used to stop and start the motor, but speed regulation is obtained by means of a field rheostat mounted on the base of the machine.

The table is automatically traversed by a ½-hp. adjustable-speed direct-current motor, built into the traverse mechanism. Variations in motor speed are obtained by means of a field rheostat attached to the front of the base and in addition change gears provide a power traverse speed range of approximately 70 to 392 in. per minute.

When direct current is not available a generator is coupled to this motor driving the wheel.

The length of the table has been increased to permit the mounting of work 36 in. in



length between centers, and to provide a table traverse motion of 32 in. for both cylindrical and surface grinding operations. The cross-feed motion of the table is 8¼ in., and a vertical movement of 8 in. for the wheel column can be obtained. Work 12 in. in diam. can be swung on centers; or 14 in. in diam., if it projects over the edge of the table.

An additional feature is provided in a lever for moving the table in short strokes. The table can be swung through an arc of 150 degrees. The usual number of fixtures is included.

— 57 —

Grinder, Tool-Room, Universal, No. 3, Motor-Driven

Oesterlein Machine Co., Cincinnati, Ohio. [Vol.65, p.1087]

A motor-driven No. 3 universal tool-room grinder is announced. The capacities and design are identical with the belt-driven No. 3 machine and the belt- and motor-driven No. 2 grinders made by this company. The motor-driven machine is entirely

self-contained and its chief features are a direct-connected motor and the complete elimination of belts.

A 1-hp. motor is used to drive the wheelhead, to which it is connected by a flexible coupling and intermediate gears which provide two-wheel speeds. This wheelhead motor is mounted on the column and the entire unit may be swiveled 90 deg. in either direction.

An inclosed motor mounted at the rear of the machine furnishes power for the workhead, the power feed mechanism and a coolant pump. By means of a selective gear box, three workhead speeds are available. Three rates of automatic table feeds are also provided. Three means of hand reciprocation of the table are also available: a high- and low-ratio table feed by means of a handwheel and a lever feed that is used for quick, short-stroke table reciprocation.

— 58 —

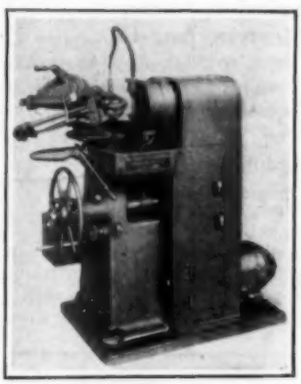
Grinding Machine, Drill, No. 2-A

William Sellers & Co., Inc., Philadelphia, Pa. [Vol.65, p.33]

This machine is designed to grind two-lip flat and twist drills from $\frac{1}{16}$ to 3 in. in diam. With a special set of jaws it will also grind 3-lip drills from $\frac{3}{4}$ to $2\frac{3}{16}$ inches in diam. No parts have to be substituted to change from one sized drill to another and where necessary the machine can be used to reshape a burned out or broken cutting edge by taken a heavy slicing cut first, followed by a light finishing cut.

The drill is held in a chuck with the edge of the drill at the correct angle with the grinding wheel. The chuck holds the drill between hardened steel jaws on the flutes near the cutting edge, while a center, adjustable to the length of the drill, supports the shank end.

The emery wheel is mounted on a spindle of high-carbon steel, which is carried on a swing frame operated by means of a hand lever. The movement obtained in a plane normal to the axis of the spindle is said to facilitate the grinding operation and to keep the working face of the emery wheel straight. The machine grinds on the flat surface of the wheel, so that line contact is made. The



wheel is covered by a cast-iron guard and exposes only a small portion of the wheel. The guard is of such shape that the water is carried down to the pan without splash. The water is supplied by means of a pump.

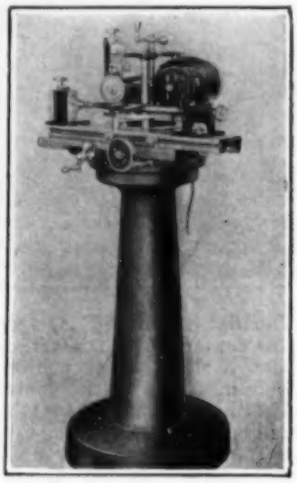
The machine is furnished with either motor or belt drive. In the former case the motor is mounted on a base plate integral with the machine. With belt drive the cast-iron bed plate is omitted and an overhead countershaft is provided.

— 59 —

Grinder, Circular, Relief

Cleveland Tool Engineering Co., Main and West 25th Sts., Cleveland, Ohio. [Vol. 65,p.34]

This relief grinder has been designed for grinding in one operation taps, fixed and



adjustable reamers, milling cutters and other tools that require clearance along the sides. The face of the grinding wheel is dressed concavely to exactly the same curvature as that of the tool to be ground. This is accomplished by means of a diamond mounted in a graduated holder above the grinding wheel. The tool to be ground is offset from the center of the curve by means of a traverse movement of the table.

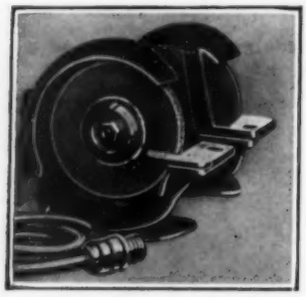
The machine will swing work 5 in. in diam. and 15 in. in length between centers. The longitudinal movement of the table is 15 in. The cutting wheel is 4 in. in diam. and it rotates at 6,250 r.p.m. The downward movement of the wheel is secured by means of a handle on the head, graduated in thousandths of an inch. For spiral work the head itself can be swung and its movement measured in degrees. The feed screw and the cross feed are also graduated in thousandths of an inch. A ½-hp., a.c. or d.c., single-phase motor rotating at 1,725 r.p.m., is recommended. The spindle is made of special alloy steel and is mounted on SKF ball bearings in dustproof housings. The floor space is 32 x 39 inches.

— 60 —

Grinder, Electric, Tool, Model 75

Forbes & Myers, 172 Union St., Worcester, Mass. [Vol. 65,p.384]

The model 75 electric tool grinder illustrated is designed for use on electric light circuits of 110- or 220-volt, single-phase. The motor is a single-phase, squirrel-cage type. The grinding unit is of the flat-front type.



The flat is but 1⅝ in. from the center of the shaft, so that a 6-in. wheel projects well in front of the motor. The motor is rated at ½ hp. and is fully inclosed.

The rotor consists of an iron core mounted upon a steel shaft. Aluminum bars are inserted in slots in the core, and are welded at their ends into an aluminum ring. The rotor is mounted upon ball bearings packed in grease. The stator is of the usual laminated type with slots for the winding. The main coil of heavy wire receives its current directly from the line, while an auxiliary winding of many turns of fine wire receives its current through a condenser mounted on the rear of the motor.

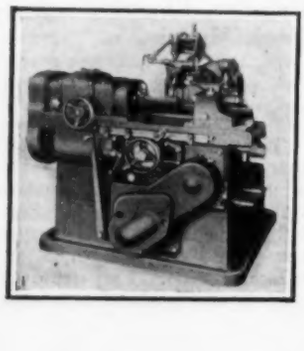
Tool rests are provided that are adjustable in two directions. Six feet of lamp cord and plug are standard equipment.

— 61 —

Grinding Machine, Worm, Automatic

Pratt & Whitney Co., Division Niles-Bement-Pond Co., Hartford, Conn. [Vol.65,p. 570]

This automatic worm grinding machine will grind either single or multiple threads on one or both sides, as desired. The bed supports a sliding table and a wheelslide at right angles to each other. All controls are on the front of the bed and change gears are provided for the necessary work speeds. The machine is motor-driven and requires a 5-hp. constant-speed motor for thread depths up



to 0.400 in. and a 7½-hp. motor for thread depths from 0.400 to $\frac{9}{16}$ inches.

The wheelhead is arranged so that the wheel can be swung 30 deg. to the right and 45 deg. to the left to accommodate various thread angles. The wheel is fed to depths by means of a screw, operated by a handwheel and ratchet operated by dogs on the table. The machine grinds in one direction only, and the wheel is withdrawn from the work after each pass. The table has a maximum travel of 7 in. and its movement is controlled by a cam, specially cut to suit the lead of the worm being ground. A simple device takes care of indexing for multiple threads. By means of a differential mechanism the leads can be picked up when setting the work and the same means can be used to give longitudinal feed to the work when one side only of the thread is being ground.

— 62 —

Grinder, Valve, Electric, No. 45

Black & Decker Manufacturing Co., Towson, Md. [Vol. 65,p.889]

This valve re-facer is equipped with universal motors, one driving the work head, the other, the grinding wheel. The workhead is permanently set at 45 deg. The grinding head is mounted on dove-tail slides with automatic spring take-up gibs.

Automatic adjustment for wear is also provided on the chuck spindle which is mounted in a taper bearing.

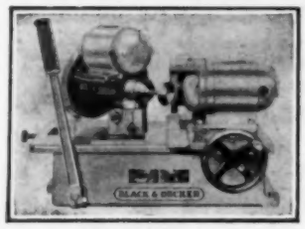
Standard equipment includes a diamond truing attachment, a V-block attachment for grinding ends of valve stems; a special three-jaw re-facer chuck, electric cable and attachment plug, and individual switches.

— 63 —

Grinder, Valve, Electrical, No. 90

Black & Decker Manufacturing Co., Towson, Md. [Vol. 65,p.932]

The No. 90 electric valve re-facer is a heavy duty machine with an adjustable



workhead permitting the refacing of poppet valves at any required angle. The workhead is adjustable from 0 to 90 degrees.

Two individual electric motors are used, one driving the workhead, the other, the grinding wheel. Each motor is provided with an individual switch. Both motors are of the universal type and operate on direct or alternating current of 25 to 60 cycles.

The workhead and the grinding head operate on V-slides, to which they are held by spring clamps. Both heads have three-points suspension. The base also rests on three points so as to eliminate the possibility of the machine teetering.

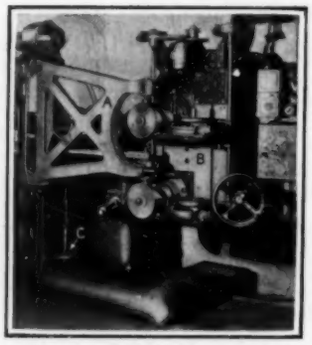
— 64 —

Grinding Machine, Cam, Duplex

Keller Mechanical Engineering Corporation, 70 Washington St., Brooklyn, N. Y. [Vol.65,p.691]

The duplex cam grinding machine is intended to grind the hardened surfaces of cams of both the barrel and the flat types. It is a modification of the weight-controlled, die-sinking machine made by this company.

A swinging arm carries the grinding wheel and the roller follower both of the same diameter. This arm is carried on pivots on a saddle which is, in turn, carried on



a horizontal slide so that the wheel is capable of adjustment horizontally all the way across the work table. The roller follower contacts with the master cam against which it is held by a suitable weight.

The tracer for a disk cam is slightly tapered so that the depth of cut can be varied somewhat by changing the position of the follower.

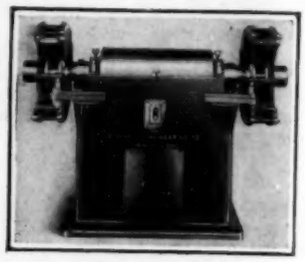
Four rotating spindles are located on the work table, and their positions are adjustable vertically. Two of the spindles are horizontal for use with barrel cams and the other two have vertical axes for use with disk or edge cams. In either case the top fixture always carries the master cam.

— 65 —

Grinder, Motor-Driven, Two-Speed

Mitchell Engineering Co., Springfield, Ohio. [Vol.65, p.304]

In this machine the motor is mounted on the rear on a slidable base with vertical adjustment. It is the ball



bearing type, fully inclosed and ventilated. The motor is controlled by a push button.

The grinding spindle is provided with a two-step cone pulley, so that two wheel speeds can be obtained. The wheel load is carried on four heavy-duty ball bearings that are mounted in cast-iron bearing housings that have spherical seats in the pedestal. This ball and socket arrangement assures alignment of the spindle and equal distribution of the load on all bearings. The ball bearings are fully inclosed against the entrance of dirt and abrasive matter.

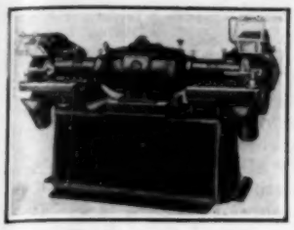
The grinding wheels are provided with suitable cast-iron guards and adjustable tool rests. The machines are built in several sizes to accommodate wheels 10 to 24 in. in diam. Any standard motor may be used where preferred.

— 66 —

Grinder, Adjustable-Speed, Heavy-Duty

United States Electrical Tool Co., Cincinnati, Ohio. [Vol.65,p.616]

The heavy-duty ball-bearing adjustable-speed grinder has the same general specifi-



cations as the other heavy-duty grinders made by this company, but in addition it is designed for a constant peripheral speed of the wheel regardless of the wheel diameter. This constant speed is attained by means of an automatic adjustment that regulates the motor speed with adjustment of the guards for wheel wear.

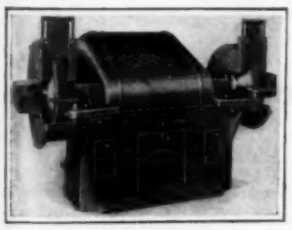
The adjustable-speed grinder is made for both 110 and 220 volts, d.c., and for 220, 440 and 550 volts, 2- and 3-phase alternating current. With direct current a constant periphery speed can be obtained regardless of the wheel sizes, while on alternating current speeds can be obtained of 900, 1,200 and 1,800 r.p.m. for 24, 18 and 12 in. wheels respectively.

— 67 —

Grinder, Floor, "Rite-Speed"

Safety Emery Wheel Co., Springfield, Ohio. [Vol.65, p.927]

The drive of the "Rite-Speed" floor grinder is such that proper operating speeds for grinding wheels can be obtained with different size



wheels and with either a.c. or d.c. motors.

The motor is mounted within the machine and it drives the spindle by means of a silent chain. By changing the sprocket diameters any practical grinding wheel speed can be secured. In either case, a ball bearing type motor is furnished.

The grinding-wheel spindle is also supported on three double-row deep groove ball bearings. In order to take up chain wear, the motor is mounted upon a sliding base.

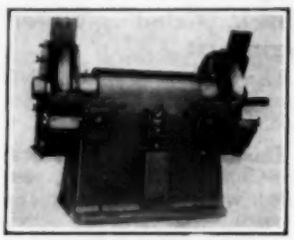
These grinding machines are offered in four sizes to accommodate wheels ranging from 14 to 30 in. in diam. and for motors ranging from 3 to 15 hp., depending upon the requirements. Automatic starters with push-button control are also furnished.

— 68 —

Grinding Machine, Type RW

Ransom Manufacturing Co., Oshkosh, Wis. [Vol.65, p.1007]

This improved line of grinding machines, known as the RW type, is made in several sizes. The machines are driven by integral motors



mounted in the base. Any type of motor for use on any commercial circuit can be supplied. Drive to the spindle is by belt from a motor mounted on a hinged bracket. Any desired spindle speed can be obtained by changing the pulleys on the motor or on the spindle.

The spindle of each unit is exceptionally large and runs on SKF ball bearings. The rest brackets are removable to permit the grinding of large castings. Fabricated steel guards conforming with recommended practice are used.

This type of machine can be used with regular abrasive wheels or with rubber-bonded wheels running at 9,000 to 10,000 ft. per minute.

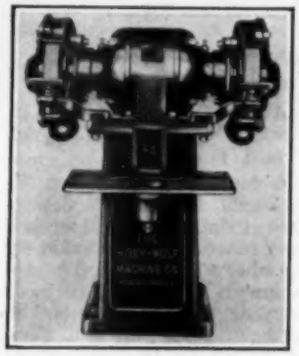
— 69 —

Grinding and Buffing Machines

Hisey-Wolf Machine Co., Cincinnati, Ohio. [Vol.63, p.1047]

This company is building a line of motor-driven, double-end grinding, buffing and polishing machines for use on either alternating or direct current. The floor-stand grinder is illustrated. For single-phase a.c., the machines are equipped with improved commutating-type repulsion-induction motors. For two- and three-phase a.c., the machines are equipped with squirrel-cage motors.

In all cases high-grade ball bearings are mounted in end heads in close proximity to



the wheels. Buffing and polishing machines with incased-type spindle extensions are equipped with four ball bearings, while in the open-type spindle extension two bearings are used. All bearings are completely inclosed and protected from dust and grit.

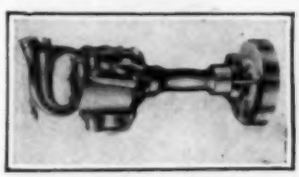
The floor-stand grinder is made in five sizes, with wheels varying in diameter from 7 to 14 in. and ¾ to 2½ in. in face. Three of the sizes are also made with bench base mountings. The incased-spindle type buffing machine is made in four sizes, each with two buffing and polishing wheels varying in diameter from 10 to 18 in. and from 1½ to 3 in. in face. The smallest machine is also made with bench base mounting. Five sizes of the open-type spindle extension machine are made with wheel diameters varying from 8 to 18 in. and with faces varying from 1 to 3 in. The two smaller sizes are made with bench base mounting.

— 70 —

Grinder, Portable, Pneumatic, No. 33, "Little Giant"

Chicago Pneumatic Tool Co., 6 E. 44th St., New York, N. Y. [Vol.65,p.383]

The No. 33 "Little Giant" grinder illustrated is for use on many classes of production work where high speed and continuous service is required. The drive is by means of an air motor consisting of 3 cylinders, placed 120 deg.



apart. Each cylinder is provided with its own valve of the piston type and the vent tube is of the centrifugal ball check type. The pistons and toggles are of the pin type. The stuffing box packing consists of cup leathers that embrace the spindle just sufficiently to prevent leakage.

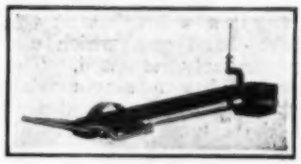
The machine is designed so that there will be a minimum of vibration. The speed under no load is 4,000 r.p.m. The arbor is ⅝ in. in diameter. The wheel or wire brush regularly furnished is 6 in. in diam. and 1 in. face. The tool weighs 15½ pounds.

— 71 —

Grinder, Side-Rod, Portable, No. 18

Safety Emery Wheel Co., Springfield, Ohio. [Vol.65, p.188]

The No. 18 portable grinder is designed for side-rod work but it can be used for similar operations in other lines. The unit may be suspended in any manner to accommodate local operating conditions. It handles with ease since it is counter balanced. It may be speeded for any size and



type of wheel up to and including 12 in. in diameter, whether the wheel be for grinding, polishing or buffing. A special attachment for the mounting of small spools for grinding fillets is part of the equipment.

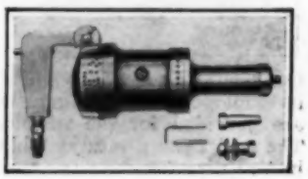
Essentially the machine consists of a tubular support with an inclosed motor at one end and a spindle mounted on ball bearings at the other. A belt that is protected by a sheet metal guard connects the two and furnishes the drive. Suitable handles are provided at the spindle end to facilitate operation of the unit.

— 72 —

Grinder, Die, Portable

United States Electrical Tool Co., Cincinnati, Ohio. [Vol.65,p.888]

The portable grinder illustrated is for use in grinding dies, welded parts, fins on light castings, and on other parts where speed and ac-



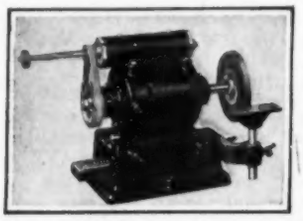
curacy is required. The adjustable back handle permits operation within a limited space. The spindle speed under load is 11,000 r.p.m. The complete tool weighs 12 pounds.

— 73 —

Base, Tool-Grinder, "Dumore"

Wisconsin Electric Co., Racine, Wis. [Vol.65,p.37]

In order to facilitate tool grinding, as well as internal grinding, this company has



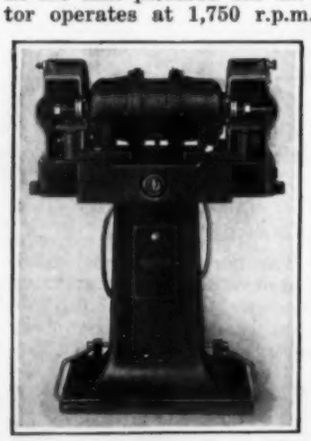
designed a base for its No. 2-AG "Dumore" grinder. The base has two wing nuts to clamp the motor unit in any position desired, and also carries a bracket at the right-hand end, which can be similarly adjusted. The bracket has a single wing nut to permit the adjustment of the column to the small table.

— 74 —

Control, Foot, Tool-Grinder

Safety Emery Wheel Co., Springfield Ohio. [Vol.65, p.266]

The tool grinder illustrated starts when the operator steps on the treadle and automatically stops when he leaves the machine. The grinding wheels are mounted directly on the motor spindle. In the unit pictured the motor operates at 1,750 r.p.m.



full load, and a 12-in. wheel is employed. Ample guards are provided for the wheels. The tool rests are adjustable in two directions.

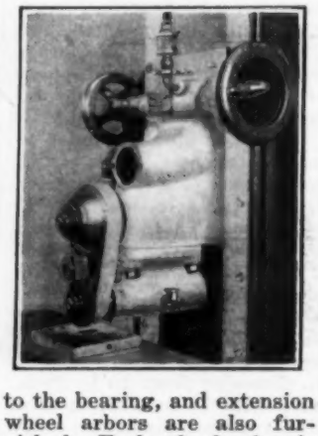
— 75 —

Grinding Attachment, Surface, "Abrasive"

Abrasive Machine Tool Co., East Providence, R. I. [Vol. 65,p.227]

A high-speed grinding attachment for its No. 3 surface grinding machine has been placed on the market by the above company. The attachment is claimed to have been developed to meet the needs of gage and tool work where wheels of small diameter are required.

Provision is made for mounting small wheels close



to the bearing, and extension wheel arbors are also furnished. Each wheel arbor is fitted with an integral pulley of the proper diameter to give the correct wheel velocity. The wheelspindle is massive, and is mounted on ball bearings.

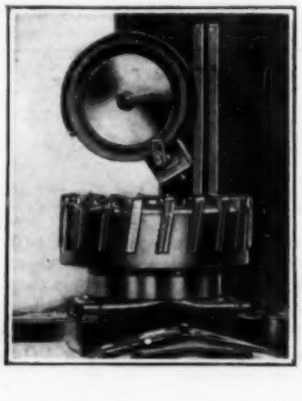
Power is derived from a pulley mounted on the main spindle in the wheel adapter. An idler pulley mounted on ball bearings provides means for maintaining the tension in an endless canvas belt.

— 76 —

Rest, Tooth, Face-Mill

Cincinnati Milling Machine Co., Cincinnati, Ohio. [Vol. 65,p.346]

This special tooth rest attachment is for use in spiral grinding the peripheral edges of a face mill. The



attachment is fastened to the wheel slide underneath the front spindle bearing. The tooth rest blade is tilted to correspond with the rake of the cutter blades. It is set as low as the spacing of the cutter blades will permit.

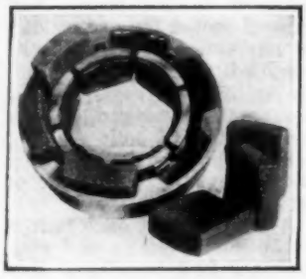
The operator rotates and keeps the cutter blade in contact with the tooth rest blade with his right hand, while he moves the wheel-slide up and down with his left hand. The device is adjusted to the proper angle by a clamp actuated through a hexagon capscrew.

— 77 —

Chuck, Grinding-Wheel, Segmental

The Carborundum Co., Niagara Falls, N. Y. [Vol.65, p.655]

This improved segmental grinding-wheel chuck is provided with Carborundum or Aloxite segments. The chuck is a heavy-duty type and is



designed for production work. It provides for the mechanical holding of segments by means of a series of clamping bolts and rocker bearing blocks within a heavy ring or chuck body.

Wheel chucks are available in sizes from 18 to 30 in. in diam., using from 6 to 11 segments according to size. A single size segment is used for all sizes of chucks. These segments are 6 in. long, 7 in. high, with a 2-in. face. They are curved on a diameter of 22 in. both inside and outside.

— 78 —

Center, Index, Adjustable

John B. Stevens, Inc., 27 Cleveland Place, New York, N. Y. [Vol.65,p.1046]

The adjustable dial index center shown in the illustration is for use in recutting or grinding flutes in taps or reamers or teeth in cutters. The regular dial is

drilled for three or four stations.

A rectangular base with tongue for ⅜-in. T-slots is regularly furnished, but tongues for ⅝- or ½-in. T-slots can be supplied, if specified. A round base can also be furnished, permitting the swiveling of the head 25 deg. either way of the machine centerline, for grinding or cutting at an angle. The maximum swing is 7 in. in diameter.

Lathes

— 79 —

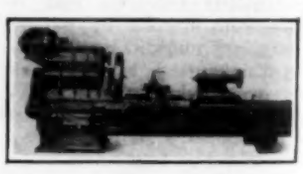
Lathes, Engine, Heavy-Duty, Series F

Rahn-Larmon Co., Cincinnati, Ohio. [Vol.65,p.386]

The series F heavy-duty engine lathe is being built in sizes 30 and 32 in. with either motor or belt drive and an all-geared head.

Four special features have been added to the redesigned tool. The tail stock has been made very massive, the carriage has been widened, the compound rest has been strengthened and widened on the slide, and the apron has been improved. The apron is of the double-wall type and is equipped with a self-oiling device for the rear bearings. It has been arranged for friction cross feed.

The feed of the apron is controlled by a heavy-duty,



all-steel gear box. It is possible to cut threads having a lead of $\frac{1}{32}$ in. down to a lead corresponding to 24 threads per inch. The gears are forged and heat-treated and are mounted on chrome-nickel steel driving shafts.

The all-geared head gives

twelve spindle speeds ranging from 5 to 275 r.p.m. The spindle itself is a heat-treated forging. A 15-hp. motor is regularly used to drive this lathe, but a single pulley drive can also be furnished.

— 80 —

Lathe, "Rapid-Production," 16-Inch

R. K. LeBlond Machine Tool Co., Cincinnati, Ohio. [Vol.65,p.469]

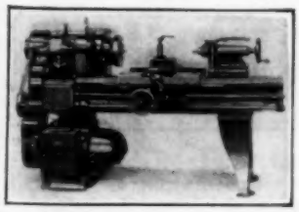
The 16-in. "Rapid-Production" lathe illustrated is designed for the quantity production of plain turning and facing work. Some of its features are a geared head mounted upon roller bearings; automatic lubrication to the headstock, feed, and traverse mechanism; and power rapid traverse for the carriage and cross slide.

The headstock is of the selective speed type, and the drive is through a multiple disk clutch incorporated in the driving pulley. A quick-acting friction brake is also contained in the pulley.

Twenty-seven feeds are provided, ranging from 0.003 to 0.108 in. per rev. The power rapid traverse mechanism is effective on both longitudinal travel of carriage and cross travel of the slide in either direction.

The apron is a single piece box casting of the double-wall type. A submerged geared pump provides lubrication to the carriage and closs-slide bearings, and is positively driven while the feed is engaged.

The bed incorporates this company's "Compensating Vee" construction on the front shear, which provides a bearing surface approximately at right angles to the tool pressure on all diameters. The carriage has a



long bed and a large cross slide bearing, both automatically oiled. The tailstock is of the setover type. A plain block rest and single-screw tool post are regularly furnished. Other attachments, such as a compound rest, taper attachment, lever operated tailstock, oil pan, pump and piping, turret tool post, drawn-in attachment and collets and motor drive can be furnished when specified.

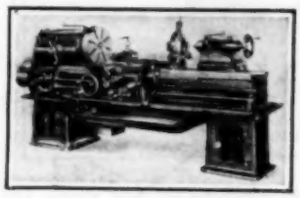
Two kinds of motor drive are offered; a constant-speed motor mounted on top of the headstock and driving through a large gear, or a constant-speed belted motor for either a.c. or d.c. service, with the motor housed in the base of the front cabinet leg. The lathe swings work 17¼ in. in diam. over the shears and 10¼ in. in diam. over the plain block slide rest. With a 6-ft. bed it takes work between centers up to 2 ft. 9 in. in length. Six spindle speeds are provided with a range from 47 to 450 r.p.m. The spindle is regularly supplied with a No. 4 Morse Taper.

— 81 —

Lathe, Geared-Head, Ball-Bearing

Sidney Machine Tool Co., Sidney, Ohio. [Vol.65,p.884]

The outstanding feature of this ball-bearing gear-head lathe is the control of the headstock, which is by means of a single lever. Eight spindle speeds ranging from



12 to 317 r.p.m. are obtainable, and the changes can be made while the spindle is in motion. In the neutral position of this lever, a positive acting brake is applied. A similar arrangement is provided for the apron control levers.

In the headstock at least four gears are in mesh at all times, and because of this it is claimed that there is positive freedom from tool marks on finished cuts. All the gears are heat-treated.

The apron is of the double-plate type. Mechanical apron control is part of the standard equipment and provides feeds ranging from 0.005 to 0.150 in. per revolution.

Drive is furnished from a motor mounted inside of the cabinet leg on an adjustable shelf. Single-pulley drive without the motor in the base can also be provided.

The drive shaft, intermediate shaft and all thrust bearings in the headstock are equipped with SKF deep-groove ball bearings. Forced feed lubrication is supplied.

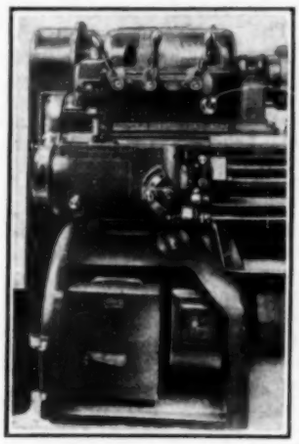
The machine is built in bed lengths ranging from 8 to 30 ft. The swing over the Vs is 19¼ in., over the carriage, 12¾ in., and over the compound slide rest, 10¼ in. The maximum distance between centers on the 8-ft. machine is 48 inches.

— 82 —

Lathe, Tool Room

Lodge & Shipley Machine Tool Co., Cincinnati, Ohio. [Vol.65,p.1006]

The motor driven tool room lathe is now equipped with a motor leg inclosing all



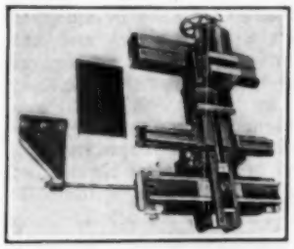
of the electrical equipment. This arrangement eliminates the necessity of exposing any of the electrical parts or wires. The leg is divided into two compartments. The motor is contained in the rear compartment and the starting equipment in the front, where it is accessible.

— 83 —

Lathe, Engine, 24-Inch, Improved

Lodge & Shipley Machine Tool Co., Cincinnati, Ohio. [Vol.65,p.1008]

Several changes have been made in the headstock, apron and other parts of this 24-in.



engine lathe. In the headstock all the gears are hardened. Internal positive clutches are provided in the face gear and in the large transmission gear instead of external draw clutches.

The lathe can be furnished with a power rapid traverse to the carriage in either direction. The mechanism makes use of multiple-plate clutches.

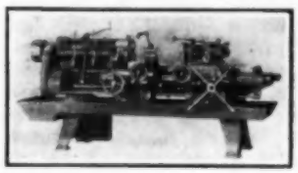
An improved and heavier type taper attachment is supplied. The slide is carried in a guide supported by a bracket that extends under and over the slide, effectively tying the guide to the carriage and preventing lifting. The swiveling bar is a box section and the shoe is rectangular instead of taper and has a taper gib. The guide bar is attached directly to the cross feed screw, which has been enlarged. The cross feed screw can be used for feeding while the taper attachment is in operation, so that taper threads can be chased.

— 84 —

Lathe, Turret, Universal, No. 2, Duo-Control

Acme Machine Tool Co., Cincinnati, Ohio. [Vol.65, p.223]

Several changes have been made in the design of the No. 2 universal flat turret lathe illustrated. A single movement automatically disengages the multiple-disk main drive clutch, and at the same time sets a brake so that the gears rotate very slowly, or not at all, while the shift is being made. In



this way the speed can be changed from the lowest to the highest without noise.

The feed change box formerly placed at the end of the bed has been eliminated. In the present design both the turret and the side carriage are provided with twelve independent feed changes, selected by means of a single rod. The feed-changing mechanism is mounted on ball bearings, completely inclosed in a bath of oil.

The thread-cutting attachment has been redesigned so that it is possible to cut a thread the full distance between the turret face and the chuck face. The bracket that carries the half nut for screw feed is arranged so that it can be mounted on

either side or the turret carriage. In this way it is possible to cut threads with tools arranged on either carriage. Other minor improvements have also been made.

— 85 —

Lathe, Turret, Universal, No. 3-A, 4½-Inch

Warner & Swasey Co., Cleveland, Ohio. [Vol.65.p. 345]

The No. 3-A, heavy-duty, universal turret lathe with a 4¼-in. bar capacity, retains many of the features of the 7¼-in. machine, described on page 877, Vol. 64, of the *American Machinist*. Due to the fact that it is a smaller machine, however, several other changes have been made. The design is such that heavy cuts can be taken in both the hexagon turret and the square turret at the same time.

The capacity for bar work and the swing over the ways has been materially increased. For bar work the

machine has a capacity through the chuck of 4¼-in. round bars, and a maximum turning length of 45 in. On chucking operations the machine is equipped with an 18-in. extra-heavy three-jawed geared scroll chuck. The maximum swing over the ways is 25¼ in., while the square turret carriage clears a diameter of 18 in. The hexagon turret carriage has a maximum longitudinal movement of 48 in., while the square turret has a cross travel of 12¾ inches.

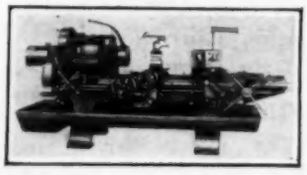
The size of the all-geared head has been reduced as compared with the larger machine, but the same broad-faced, heat-treated alloy steel gears are used. A driving motor of 10, 15, or 20 hp. is supplied. Twelve spindle speeds are available.

— 86 —

Lathe, Turret, Universal, No. 2-B, Improved

Foster Machine Co., Elkhart, Ind. [Vol.65,p.384]

The No. 2 universal turret lathe has been improved. Heavy-duty, multiple-disk clutches control the forward and reverse movement of the spindle. The power rapid-traverse unit on the turret slide is similarly equipped with clutches. The thrust from the spindles is now carried on heavy-duty ball thrust bearings. Another feature is the split-ring type turret binder, which entirely surrounds the turret



and clamps on a ledge of almost equal area.

The shafts carrying the sliding gears are all splined. The shafts are made of chrome-nickel steel and are heat-treated. All gears in the head are also heat-treated and operate in a bath of oil.

The spindle itself is a forging, heat-treated, and ground to final size. Twelve reversible spindle speeds may be obtained. These range in geometrical progression from 16 to 325 r.p.m. The gears in the power feed unit are also made of steel and run in oil. The worm gears, however, are made of special bronze.

The bed of the machine has been lengthened 12 in. and now swings work 22 in. in diam. over the bed and 13¾ in. in diam. over the cross slide. The round bar capacity through the automatic chuck is 3¾ inches.

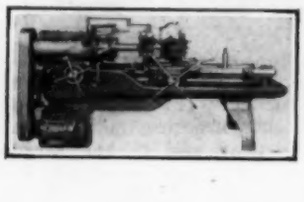
— 87 —

Lathe, Turret, Flat, Hartness, 4x34-Inch

Jones & Lamson Machine Co., Springfield, Vt. [Vol.65, p.383]

A larger model has been added to the line of Hartness flat turret lathes. The model illustrated is styled 4x34-in. and is made both as a bar machine and as a chucking lathe. The lathe is equipped with a 17-in. chuck and has a swing of 21 in. on centers and 17¼ in. over the ways.

The headstock has been designed so as to give additional spindle capacity and also to add to the rigidity of the lathe. The spindle is



mounted on split bronze bearings, while all other shafts in the gear heads are mounted on ball bearings. Both the gears and the shafts are made of heat-treated alloy steel. The speed changes, both forward and reverse, are effected by means of multiple-disk clutches of ample capacity.

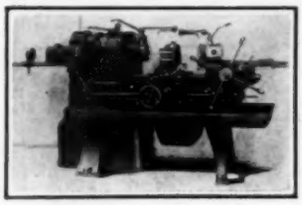
The bar outfit is similar to that of other Hartness flat turret lathes. The large square turret on the chucking machine together with the closs sliding headstock, is said to make possible simple multiple tooling. It is claimed that inexpensive standard tooling is sufficient for the majority of chucking work and that special tools are very seldom required.

— 88 —

Lathe, Turret, Universal, No. 4, Improved

Warner & Swasey Co., Cleveland, Ohio. [Vol.65,p. 926]

This company has made a number of improvements in its No. 4 universal turret lathe. The bar capacity of



the machine is for stock 1¼ in. in diam., while the swing over the ways is 16 in. The improved machine is provided with three types of head: A six-speed all-geared head, a six-speed cone head, and a twelve-speed all-geared head.

The six-speed all-geared head has been entirely redesigned. Spindle speeds ranging from 45 to 423 r.p.m. are instantly available by means of convenient levers located on the head. Two reverse speeds are also provided. The shafts are mounted upon Timken roller bearings, except for the spindle proper.

The six-speed all-geared head is well suited to individual motor drive, and for this purpose a pedestal leg is provided in which the motor can be mounted at the head end of the bed. Provision is also made for mounting the motor on a vertical plate fastened at the head end of the machine.

The six-speed cone head has also been redesigned. By means of a geared friction drive, six spindle speeds are available, with a three-step cone and back gears, which are always in mesh. By running both pulley countershafts forward at different speeds, the number of obtainable spindle speeds with this cone type is raised to twelve, but no reverse movement is provided. The twelve-speed all-geared head remains unchanged.

Power longitudinal cross feeds in either direction are standard in the cross slide carriage, which has been strengthened. The square turret may be operated simultaneously with the tools on the hexagon turret.

The turret slide and saddle unit are the standard Warner & Swasey type. Six power feeds are available through a gear box.

The No. 4 universal turret lathe is offered as a simple machine, or with standard bar of chucking equipment. A taper attachment and a screw threading attachment is also available.

— 89 —

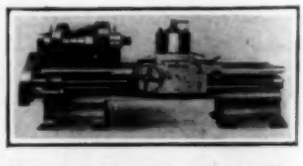
Lathes, Monitor

Flather & Co., Inc., Nashua, N. H. [Vol.65,p. 303]

This company is putting out a line of monitor lathes in all sizes from 16- to 36-in. swing. The headstock has all-steel gears. The back-gears are permanently engaged, and the spindle is controlled by a clutch.

The wide cross-slide is fitted with a six-position turret that is indexed by hand and locked automatically in each position. This turret revolves on roller bearings, but when held by the clamping lever the thrust is borne by fixed bearing surfaces.

A rapid-power traverse is provided for the carriage. It is accomplished by a right-and-left-hand screw of quick



pitch, engaged by nuts that are under control of the handwheel when the latter is pulled out. There is an automatic knockout at the rear end of the bed, so that the carriage cannot be made to overrun.

The remaining features of the machine are those of the standard Flather lathe of corresponding size. Change gears or geared feed-box may be furnished as desired.

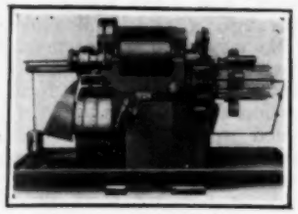
— 90 —

Lathe, Turret, Automatic, Single-Spindle, Gridley

National Acme Co., Cleveland, Ohio. [Vol.65,p.547]

The claims made for the improved Gridley single-spindle automatic turret lathe are increased power adaptable to the most modern machining requirements of feeds and speeds, ease of change-over, and the greater sturdiness to reduce maintenance costs. The improved machine is being featured in the 4½-in. size.

One broad belt or a single constant-speed motor is used for the drive. This simplification is accomplished by a geared head built into the



tailstock and having one set of change gears for the spindle speeds and feeds, and a second set of gears for changing the feed independent of the spindle drive. The motor is mounted on top of the geared head, and power is transmitted by means of a silent chain.

Other refinements incorporated in the present machine include complete redesign of the spindle for greater strength and to secure concentric rotation of the collets, and bronze bearings to suit the increased power. The machine is equipped with a force-feed lubrication system which furnishes ample oil under high pressure to all bearings. The tools and work are also flooded with cutting compound under pressure in order to wash away chips as well as to cool the work.

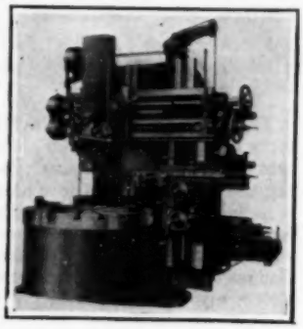
— 91 —

Lathe, Turret, Vertical, 54-In., "New Era," Improved

Bullard Machine Tool Co., Bridgeport, Conn. [Vol.64, p.183]

This improved vertical turret lathe of 54-in. capacity has one swivel turret head and one non-swiveling turret head. The machine has a table diameter of 50 in., but will actually swing work 56 in. in diam. The height under the cross-rail is 35½ in. and the maximum distance from table to turret face is 49 inches.

The bed casting of the machine has been strengthened, and machined pads are provided on the bed for the support of a forming attachment bracket for the side head. This attachment is either of the plate or of the universal type. Other features that have been added include a cast-steel main slide, an all-



steel turret and a steel side head.

The improved turret locking mechanism provides five pairs of opposed bevel surfaces that mesh positively at the five points of turret registry. The all-steel construction of the turret supplied is intended to increase the capacity of the machine for heavy cutting.

The machine is intended either for countershaft or motor drive. When specified the motor is fitted on a bracket at the rear of the machine and connected by belt with the driving pulley.

The net weight of the machine is 23,000 pounds. It occupies a floor space of 117 x 120 inches.

— 92 —

Lathe, Automatic, Model R, "Lo-Swing"

Seneca Falls Machine Co., Seneca Falls, N. Y. [Vol. 65,p.419]

The model R "Lo-Swing" lathe was particularly designed for economical small-lot production. Although this lathe represents a radical departure from the standard machine, the same feature of rigid construction and low swing has been maintained. The frame head and carriages are unusually heavy for a lathe of this capacity. Because of the compact design, the tool loads are placed almost directly over the ways, and it is said that the lathe will handle a large number of heavy cuts without noticeable deflection. The

machine is fully automatic, and the standard cams will handle a wide range of work.

The machine is designed to handle work between centers, with chuck drive. The spindle is hollow and it is possible to adapt the machine for handling bar stock. The lathe will swing work 6¼ in. in diam. over the carriage and will accommodate pieces up to 36 in. in length in the machine pictured. With modified bed length, 15- to 60-in. capacity can be obtained.

The drive of the unit is by a single pulley and an all-geared head. Where motor drive is desired, the motor is mounted directly on the head. Change gears provide feeds ranging from 0.007 to 0.040 in. per revolution.

The tailstock has been radically redesigned with a live center-piece. The way of the bed has been considerably widened and tilted at an angle. The head and bed of the machine are cast in one piece and are of unusual heavy construction. The bed is well ribbed. The coolant reservoir and settling compartments are located in the base of the machine under the head.

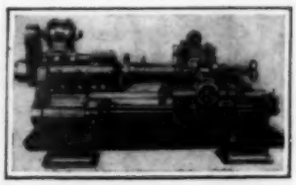
— 93 —

Lathe, Crankshaft, Semi-Automatic, 20-Inch

Wickes Bros., Saginaw, Mich. [Vol.65,p.578]

The 20-in. semi-automatic crankshaft lathe was developed for machining the center bearings, the flange end and the front end of automotive crankshafts. The machine is capable of taking heavy cuts without having its accuracy impaired. It is arranged with silent drive from a 7½-hp. constant-speed motor. The headstock provides twelve spindle speeds. Eight feeds are available from the feed box. The machine is arranged for power cross longitudinal feeds with automatic stops.

Automatic cross feed changes are available. The



cycle is as follows: When starting the cross feed, where the removal of only a small amount of metal is required, the feed is rapid. As the tool bits move down toward the finished diameter of the crank and the cuts become heavier, the feed is automatically reduced. The machine is also equipped with a Wickes patented electric rapid cross traverse to the tool bit.

The tailstock is heavy construction and is provided with an anti-friction live center. Other parts of the machine are equally rigid. A suitable coolant pump and tubing with a chip pan is supplied.

— 94 —

Lathe, Journal-Turning, Quartering and Pin-Turning, 90-Inch

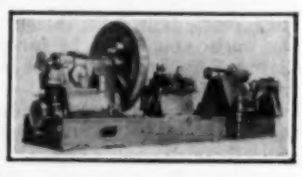
Putnam Machine Division, Manning, Maxwell & Moore, Fitchburg, Mass. [Vol.65,p. 1079]

This multi-purpose machine is for use in railroad shops. It can swing an assembled pair of 90-in. drivers for the purpose of turning the journals of the axle, facing the hub-liners, boring the crank-pin holes and turning the crank-pins in place.

The position of the tool-block is fixed, and both headstock and footstock are adjustable along the bed.

The main spindle is driven by belt from a 15-hp. constant-speed a.c. motor to the first shaft of a four-speed selective gear drive, equipped with friction clutch and brake. An adjustable-speed d.c. motor of a special type may be used as an alternative drive, in which case the belt and gear box are eliminated.

The main drive plate has a



1,000-lb. counterweight opposite to the pin-hole, and two movable counterweights of 500 lb. each at the periphery.

To function as a quartering machine the main spindle is locked with the pin-hole in the drive plate directly above the center. One of the quartering attachments is mounted above the headstock and the other one back of the footstock. The radial dis-

tance from the centerline of the machine to those of the quartering bars is adjustable, the range of adjustment being for strokes from 22 to 36 inches.

To accommodate axles of 3-cylinder locomotives the machine is provided with a separate toolblock cut away in the middle to clear the swing of the center crank-webs, and has two slide-rests with longitudinal and cross feeds to turn the short journals and face the hubs of the crank-webs.

— 95 —

Lathe, Bench, Precision, No. 6

Sloan & Chace, Inc., 351 *Sixth Ave., Newark, N. J.* [Vol.65,p.220]

The No. 6 precision bench lathe can be used for a wide range of general lathe work and in addition attachments are provided for screw cutting and for internal and external grinding. The bed is provided with flat ways

which are machined and scraped. The headstock has a three-speed cone pulley. A ball thrust bearing is provided on the spindle with a collar for adjustment. The tailstock is of the offset type.

The compound slide rest has guide plates which can be clamped along the ways to keep the slide rest in alignment with the ways.

The length of the bed is 38 in. The maximum distance between centers is 18 in. Work 10 in. in diam. can be swung over the bed and 6 in. in diam. over the compound slide rest. The hole through the main spindle is 1¼ in. in diam. The faceplate is 9 in. in diameter.

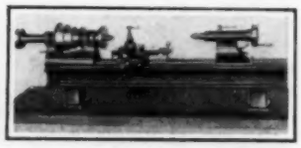
The machine is driven by means of a ¼-hp. motor back-geared or driving through a countershaft providing six spindle speeds, 60, 130, 180, 186, 340 and 690 rev. per minute.

— 96 —

Lathe, Bench, "Junior"

Rivett Lathe & Grinder Corporation, Brighton District, Boston, Mass. [Vol. 65,p.573]

The bed of this "Junior" bench lathe, including the legs, is a single, well-



seasoned casting, which is machined only upon the upper surface and along two ribs beneath to provide a bearing for the binders of the slide-rest and footstock. The spindle of the headstock is of tool steel, and the front end is hardened and ground. The bearings are split tapered sleeves of cast iron.

Instead of the usual threaded nose, the spindle has an enlarged shoulder at the front end with a taper to fit a tapered hole in the drive-plate.

The pulley has three steps and takes a 1¼-in. belt. The flange at the large end of the cone is drilled with 60 holes to provide a means of indexing work held in the spindle.

A turret slide may also be used. This attachment is furnished in two styles; one to be indexed by hand, and the other provided with an automatic indexing mechanism. A threading attachment and a milling attachment are also provided.

The lathe swings 8 in. over the bed and 1¾ in. over the compound slide. It will take a piece 17 in. in length with a footstock flush with the end of the bed and 20 in. long with the footstock overhanging. The regular equipment includes a two speed reversible countershaft. The weight of the machine, including the countershaft, but without attachments, is 200 pounds.

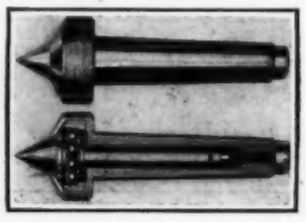
— 97 —

Lathe Center, Ball-Bearing

Nielsen, Inc., Lawton, Mich. [Vol.65,p.267]

Two features of the ball bearing center illustrated are the long spindle bearing that is intended to remove any possibility of the wobbling of the point, and the adjusting screw on the end to take up any wear.

The ball bearings run in oil and carry both the radial and thrust loads. They are entirely inclosed and pro-



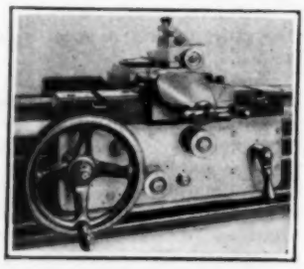
tected against dirt. The center spindle is made of tool steel and is hardened and ground. The centers are furnished in sizes of No. 1 to No. 7 Morse taper, inclusive. In addition to the standard center, three other shapes are supplied: pipe center, wood turning center and countersunk center.

— 98 —

Ball-Turning Device for Lathes

Flather & Co., .Inc., Nashua, N. H. [Vol.65,p. 342]

This ball-turning device for Flather lathes is self-contained, and it replaces the regular cross-slide, for which it is substituted by sliding its dovetailed base on the cross ways of the bridge of the carriage. The handle and sleeve are also removed from



the front end of the cross-screw, and a special quill gear for driving the device is substituted for the sleeve.

On the surface of the rotating table there is a small compound rest, the lower member of which is controlled by means of a small auxiliary cross-screw. The upper member is hardened and is provided with two set-screws for holding any standard cutting tool. Once the tool is set all subsequent adjustment for cuts are made by means of a narrow knob on the small cross-screw.

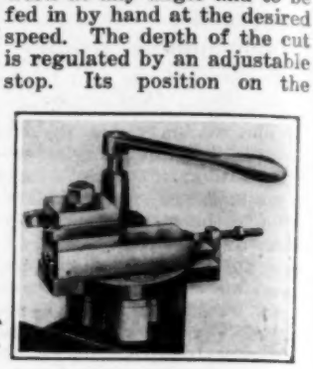
The rotating table is driven by the regular cross-feed mechanism of the lathe. The rate of feed is adjusted or the direction of rotation reversed at the geared feed box on the headstock.

— 99 —

Lathe Attachment, Angular Facing

Porter-Cable Machine Co., Syracuse, N. Y. [Vol.65, p.571]

The angular facing attachment for Porter-Cable lathes is mounted on the tailstock ways and can be moved to any position along the bed. The swivel feature allows the tool to be presented to the work at any angle and to be fed in by hand at the desired speed. The depth of the cut is regulated by an adjustable stop. Its position on the



ways and the angle of the tool are maintained by clamp screws.

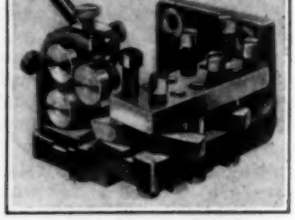
An open-type toolholder is mounted in dovetailed ways on the carriage, and is moved back and forth by a lever, through a rack and pinion. The ways are mounted on a swivel plate that can be rotated in any direction. In addition to its adaptability for such work as facing blanks for bevel gears, the attachment is useful for chamfering or necking work before or after the turning operation.

— 100 —

Turner, Multiple-Cutter

Warner & Swasey Co., Cleveland, Ohio. [Vol.65,p. 1047]

The multiple-cutter turner shown in the accompanying illustration was designed for taking two or more simul-



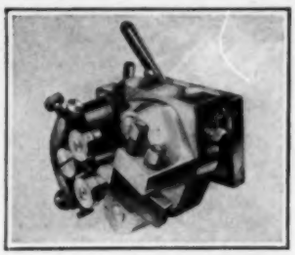
taneous cuts on bar stock or forgings.

The turner consists of three parts, the body, the top plate, and the roll carrier. The body is heavy and serves as a support for mounting the top plate and one or two roll carriers. The top plate is held in position by bolts inserted from the bottom of the tool body, and spacer bushings prevent it from springing, when the tools are clamped in position. The cutters are plain bits and are held by means of screws bearing on their tops.

The rolls on the back rest are adjustable for varying

diameters, while the back rest holder itself is adjustable longitudinally. One back rest holder with rolls is furnished with each turner. If necessary two back rest holders may be used.

For quantity lot work, single-purpose cutter blocks may be substituted for the standard blocks. These special blocks are located by means of a tongue that fits into the groove in the tool body. This method provides accurate location of the cutters after having been sharpened.



— 101 —

Turner, Single-Cutter

Warner & Swasey Co., Cleveland, Ohio. [Vol.65,p. 1085]

The cutter block swings about a hardened and ground stud and the cutter itself is held in an open slot by means of two screws. This construction is said to permit turning very close to shoulders, collets, or a fixture. The cut may be set to precede or to follow the rolls on the roller back rest. The tool can be easily adjusted for use with various diameters.

Two rolls are provided on the roller back rest. Both rolls and studs are made from hardened steel and are mounted on sturdy swing jaws. They are adjustable to the work by screws and can be clamped in position by means of a binder handle.

A hole is provided in the body of the tool to allow stock to be run through.

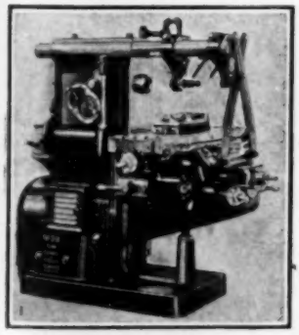
Milling Machines

— 102 —

Milling Machine, No. 3, Improved

Kearney & Trecker Corporation, Milwaukee, Wis. [Vol.65,p.341]

Except for the fact that it is smaller in size, the No. 3 milling machine illustrated is identical in design features with the improved No. 4 machine, which was described on page 881, Vol. 64, of the *American Machinist*. The machine is available in the plain, universal, and vertical types. It is designed



primarily for built-in motor drive, although provision is made for belt drive at the option of the customer. The motor compartment is totally inclosed in the base of the column and adequate ventilation is provided by louvres. The drive is direct through gears.

Timken roller bearings are used throughout with the exception of the main spindle bearings. Automatic flood lubrication is provided for all gears and bearings in the column and feed box. Splash lubrication is used for all rapidly moving parts underneath, while wick oiling is provided for the table and saddle bearing. Two separate pumps are furnished, one for the automatic flood lubrication. and the other for the cutter coolant.

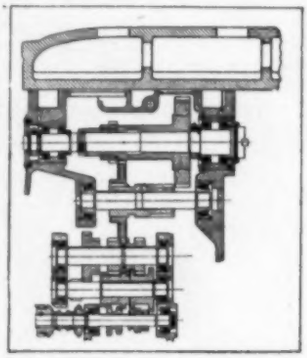
The table, saddle, and knee all have power rapid traverse — longitudinal, across, and vertical, respectively, all movements being controlled from the front of the machine. Other important features include duplicate control levers for front and rear, and high- and low-speed attachments giving 36 speeds.

— 103 —

Milling Machine, No. 5, with Roller Bearing Spindle

Cincinnati Milling Machine Co., Cincinnati, Ohio. [Vol.65,p.571]

Tapered roller bearings have been applied to the main spindle in addition to the other power shafts of the No. 5 milling machine made by this company. The main feature in this application is the use of double bearings at each end of the spindle. The bearings are so mounted as to have the front pair take the thrust, while the rear bearings are free to move



endwise to compensate for expansion.

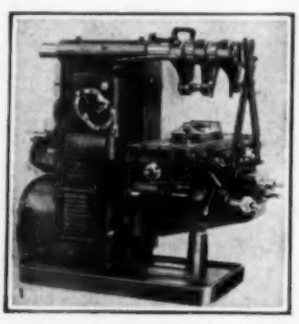
The details of applying these bearings to the spindle have been carefully worked out with the result that the builder believes that the new bearings will be more satisfactory in every way than the plain bearings formerly used. It is also claimed that about 20 per cent more power is delivered to the cutter with the same motor, when roller bearings are used.

— 104 —

Milling Machine, No. 2, Milwaukee

Kearney & Trecker Corporation, Milwaukee, Wis. [Vol.65,p.932]

Except for the fact that it is smaller in size, the No. 2 Milwaukee milling machine is identical in design features with the improved No. 4 machine described on page



881, Vol. 64, of the *American Machinist*. This No. 2 machine is available in the plain, universal, and manufacturing type.

Either belt or motor-in-base drive can be furnished. The same column is used in either case, and there are no changes in the all-geared drive. Timken roller bearings are used throughout.

Power rapid traverse in three directions is available at the work on all types, except the manufacturing, which has power feed and rapid traverse in the table only. Duplicate front and rear control levers add to the convenience of operation.

— 105 —

Milling Machine, Hand, Heavy-Duty, No. 2

Kent-Owens Machine Co., Toledo, Ohio. [Vol.65,p.302]

The No. 2 heavy-duty hand milling machine is intended to enlarge the size and scope of work that could be formerly done on this manufacturer's No. 1 machine. The frame of the machine is well ribbed for rigidity. A large coolant reservoir is cast directly in the base, and the

base is troughed for catching chips and oil. The knee, cross-slide and table have deep sections and large bearing surfaces to insure accuracy, rigidity, and long life.

The spindle is mounted on adjustable taper roller bearings and can be operated up to 2,000 r.p.m. maximum.

Long adjustable hand levers are provided and are conveniently located for the head and table feeds. The head may be moved 6¼ in. vertically, and the table 4¼ in. longitudinally. The lever feed movements are adjusted by means of positive stops. The table can be fed 22 in. and the cross slide 7 in. by means of a crank.

Drive is either by motor or from a countershaft. A 3- to 5-hp. motor is recommended. When driven from the countershaft a Hyatt roller bearing equipped countershaft is provided. The machine occupies an overall floor space of 38x60 in. and the net weight is 2,100 pounds.

— 106 —

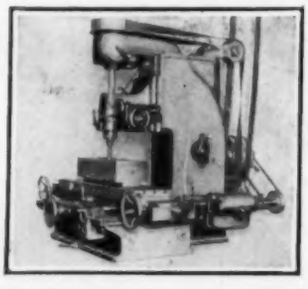
Milling Machine, Vertical, No. 6, "Becker"

Reed-Prentice Co., Worcester, Mass. [Vol.65,p.35]

The range of the improved No. 6, "Becker" vertical milling machine or die sinker has been increased. The adjustment of the head on the column is 18 in. and the spindle has an adjustment of 10¼ in. The spindle distance from the table to the nose can be varied between 0 and 30 in., while the depth of the throat of the machine is 28½ inches.

The table has a working surface of 72x20 in. Its longitudinal travel is 72 in., while its cross travel is 30 in. The height of the table above the floor is 29 in. The rapid traverse cross and longitudinal feeds are both 125 in. per minute.

The control wheels of the machine are conveniently located and the control is designed to be as nearly from one point as possible. The belt drive to the spindle is



of the usual arrangement, with idler pulleys at the rear. The main casting of the machine is heavy to give the necessary rapidity for heavy cuts and large die blocks. The universal drive shaft to the spindle traverse can be fitted to the machine or removed quickly when desired.

— 107 —

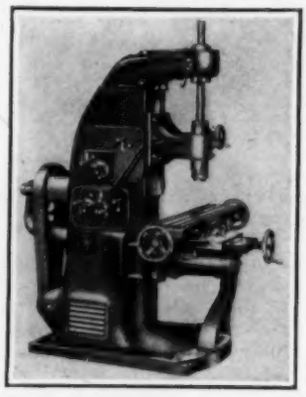
Milling Machine, Vertical, No. 4

W. B. Knight Machinery Co., 3920 West Pine St., St. Louis, Mo. [Vol.65,p.576]

The column of the No. 4 vertical milling machine is designed to allow the entire table unit to swivel around it to increase the range of the machine. The table support has a wide bearing directly on a machine arc on the base of the miller and the entire unit can be tilted around the projecting arm 45 deg. on either side of horizontal. A worm screw is provided for tilting the table also. The unit is designed so that work can be placed in position and machined where there are several angles or positions, without changing the set-up of the piece.

The spindle head may be raised or lowered by means of a screw and can be solidly locked in place. The nose of the spindle is threaded and recessed to provide a positive drive for cutters and adapter sleeves used for holding smaller shanked tools.

The machine has a constant-speed drive direct through a Johnson friction clutch built into the machine.



It can be arranged for either belt or motor drive with a motor in the base. Both the feed and the speed changes are accomplished through a sliding gear transmission, which is designed so that all gears not in use are locked in neutral.

Power feed on the spindle is reversible and is equipped with adjustable stops as well as positive ones to prevent over-travel. The table can be locked when boring operations are done.

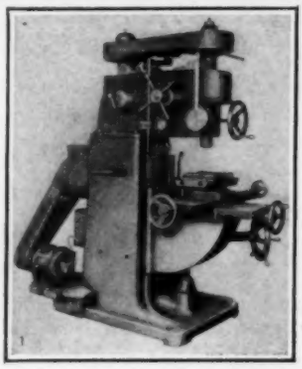
— 108 —

Die Sinker, Universal, No. 3-A

Pratt & Whitney Co., Division Niles-Bement-Pond Co., Hartford, Conn. [Vol.65,p.803]

The No. 3-A universal die sinker has been designed to handle both cherrying and straight die sinking operations without any changes of set-up or without special attachments. The design is such that it is possible to perform both roughing and finishing cherrying operations with a single cutter. When performing these operations the cutter spindle rotates through a circular path, but for ordinary die-sinking work the entire head is locked in place.

The special features of the No. 3-A die sinker are the



oscillating head and the control apparatus and drive. The upper part of the column carries the oscillating frame and spindle mechanism on its two inside surfaces. The oscillating frame is counterbalanced and is driven by two large adjustable-throw eccentrics, by means of which the circular motion of the frame and tool is obtained.

The diameter of the circular path of the tool can be adjusted from 0 to 6 in., and is controlled by a handwheel. The oscillating frame is moved by means of a handwheel at the front of the head. For ordinary die sinking cuts wherein the table elevating and traverse controls are employed, the entire oscillating head can be solidly clamped to the column.

By combining rotary table feed with oscillating cutter movement, it is possible to sink a hemispherical cut in the surface of a die and to finish it up to the polishing operation with the same cutter without the use of any attachments. A quarter cylindrical cut can be taken by feeding the cutter through an arc of 90 deg.

The machine is provided with six spindle speeds ranging from 90 to 900 r.p.m. The maximum vertical height between the working surface of the table and the spindle end is 23 in. The vertical traverse of the knee is 18 in. while the traverse and longitudinal movements are 12 and 18 in., respectively. The machine occupies floor space of 70x95, and is 93 in. high. It weighs 7,000 pounds.

— 109 —

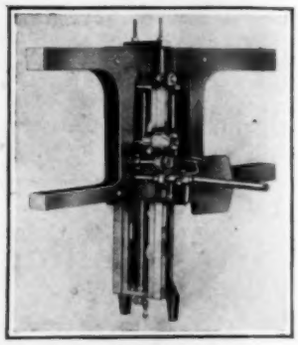
Miller, Locomotive Frame Jaw, Portable

Micro Machine Co., Bettendorf, Ia. [Vol.65,p.264]

The portable frame jaw miller illustrated is intended for milling straight smooth surfaces against which the locomotive shoes and wedges bear. It mills the full length of the jaw and finishes the top radii complete. The machine has an extreme milling length of 33 in., and an extreme milling width of 7 in.

The sliding cutter head is mounted on a heavily ribbed frame with a take-up gib to provide for wear. The spiral cutter itself is held in bearings that are in turn mounted in eccentric holders for adjusting the depth of cut. The vertical feed of the cutter head is accomplished by means of a threaded worm gear, driven by an intermediate gear and worm and wheel. A handle for lowering the cutter head is provided at the bottom.

The machine is mounted in the frame by drawing it



tight against the horizontal top section of the frame jaw with a clamp, and the lower portion is supported with an adjustable aligning bracket and screw in the opposite jaw face.

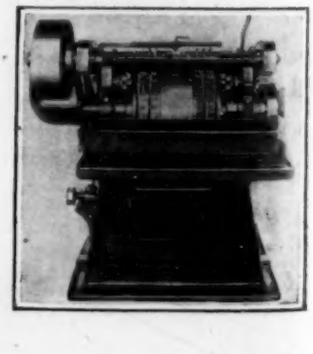
The machine is driven with a 300-r.p.m. air motor mounted on a stand and driving through a universal jointed shaft.

— 110 —

Milling Machine, Continuous Rotary, No. 3, "Craftsman"

The Equipment Manufacturing Co., Leader-News Bldg., Cleveland, Ohio. [Vol. 65,p.811]

The "Craftsman" No. 3 continuous rotary milling machine is fitted with a chuck that rotates continu-



ally, the work being inserted by hand. The standard chuck is arranged for castilating S.A.E. nuts and screw slots, but chucks having receptacles for many classes of work can be obtained. Slab milling, straddle milling, and plain milling can be performed, and four articles can be milled at the same time. Production is largely limited by the rate at which the operator can feed the machine.

The chuck is 16 in. in diam., and is driven by means of a worm and wheel controlled by a clutch. Change gears in the train provide thirty feeds to the chuck. Parts up to 2¼ in. in dia.m. by 6 in. in length can be accommodated. Two independent cutter spindles are provided, each mounted on rocker arms so as to vary the depth of cut.

The machine occupies an extreme floor space of 5 ft., 8 in. by 3 ft., 6 in. The shipping weight is 3,400 pounds.

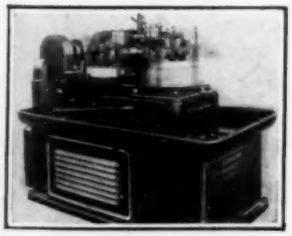
—111—

Milling Machine, Special, Pro-Ducto-Matic, No. 10

The Bilton Machine Tool Co., Bridgeport, Conn. [Vol. 65,p.806]

The No. 10 Pro-Ducto-Matic is adaptable for slab milling, straddle milling and the milling of squares and hexagons. It is semi-automatic and runs continuously. The only function of the operator is to unload and reload each fixture as the turret presents it to the unloading station.

The cutter spindle is rotated through a worm and



wheel unit driven through a universal jointed telescoping shaft. By means of a Carlyle-Johnson two-way clutch rotation of the cutters can be had in either direction. With this unit the arbor can swing cutters 6 in. in diam. in gangs up to 8 in. in width.

The entire spindle carrying unit is mounted on a slide that has a positive movement of 5 in. in either direction in a horizontal plane. This movement can be shortened to suit other work by substituting a different cam. As before, the work is held in special fixtures on a horizontal turret with a vertical axis. The turret may be indexed from four to six positions.

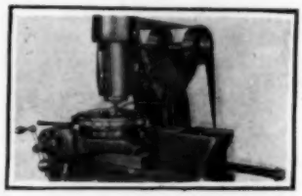
The machine has a cabinet base which incloses the driving motor. This motor, rated at 5 hp. at 1,800 r.p.m., drives the gear box on the end of the machine by means of a flexible coupling. The cutting compound is contained in a tank in the base, and is delivered to the cutters by means of a geared pump. The machine occupies a floor space of 48x72 and weighs 6,000 pounds.

—112—

Milling Attachment, Contour

Taylor & Fenn Co., Hartford, Conn. [Vol.65,p.228]

The contour milling attachment illustrated is for use in connection with this company's vertical milling machine, a description of which



appeared on page 1108, Vol. 50, of the *American Machinist*. The attachment can be used to mill cams and other pieces with irregular-shaped contours. The attachment is fastened directly to the power-feed rotary table.

The required shape is produced by means of a former-plate fastened to the table and held by spring pressure against a guide pin. A generating device is used to make the former-plate from a model or sample of the work, and a guide pin, of the same diameter as the cutter to be used later, is inserted in the spindle of the machine and the model is held against it by means of spring pressure. A revolving milling cutter occupies the position of the other guide pin against which the former-plate is later held. Speeds and feeds can be varied to suit the requirement.

—113—

Vise, Milling, "Quick-Clamp"

Universal Standard Sales Co., 500 *Murphy Bldg., Detroit, Mich.* [Vol.65,p.265]

The "Quick-Clamp" milling vise illustrated is of the automatic operating type, inasmuch as the locking mechanism engages in whatever position the pressure is applied to the jaws.

The movement of one jaw is actuated through a rack and pinion and a short hand lever. The locking mechanism consists of three pins carried on the pinion member that engage a slotted disk actuated by the lever. When

resistance to movement is applied against the pinion, the slotted disk wedges the pins against a stationary wall. Increase of resistance against the pinion only tends to wedge the pins tighter.

Planers and Shapers

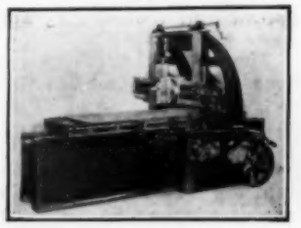
—114—

Planer, "Whitcomb," 24-Inch, Improved

Reed-Prentice Co., Worcester, Mass. [Vol.65,p.387]

Some improvements have been made in the 24-in. "Whitcomb" planer. The bed of the machine as now made is a box type, as is the table, which has been liberally cored out to reduce the dead weight to be reciprocated.

All the bearings in the driving system are lubricated by means of a forced-feed system. A Madison-Kipp



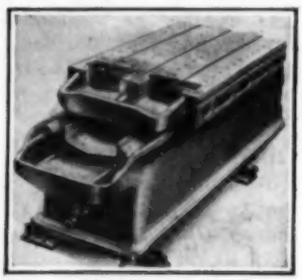
lubricator is bolted on the side of the bed and is driven by means of a belt from the main drive shaft. All other parts are lubricated by gravity feed. A central station is provided for maintaining an even level of oil in all pockets.

—115—

Planer, Improved, "Hypro"

Cincinnati Planer Co., Cincinnati, Ohio. [Vol.65,p.388]

The above company has added a new feature to its "Hypro" planers. A pocket has been cast integral on the end of the table for the purpose of catching chips. It is



said that in this way the possibility of chips getting between the bed and the table and cutting one or both is obviated, and the accuracy of the planer is assured. The pocket is heavy enough to stand rough usage and is large enough to catch and carry all the chips that will come off.

—116—

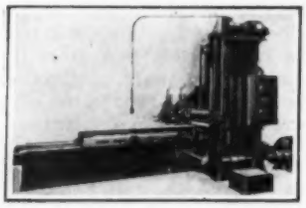
Planer, Open-Side, 36-Inch, Improved

The Cleveland Planer Co., 3148 *Superior Ave., Cleveland, Ohio.* [Vol.65,p.807]

The improved open-side planer, 36x36in. x 12 ft., has a motorized drive and complete electrical control. By means of drum controllers, power rapid traverse is obtained for both heads, and by the same means, the knee is elevated or depressed.

The bed has been made much heavier throughout. It is closed on top and has cross ribs at close intervals to make a box-like construction. Filtered oil is forced under pressure to the Vs, which are broadly spaced to furnish rigidity under the cutting pressure. Automatic rollers and wipers are provided so that the table is wiped at both ends of the stroke. Hence a double-length of bed is not necessary.

The column is full box



form and is cast solid with the bed up to the table level, at which point the upper section is securely bolted and doweled to it. Combined plate and box-form construction is used for the knee, which is raised and lowered by means of a power elevating screw.

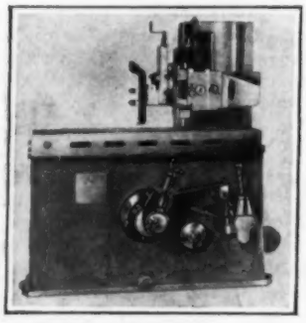
A dial-feed mechanism controls the travel of the heads in either direction. Automatic feeds are also provided for vertical travel. The saddles are graduated for angular planing.

— 117 —

Planer-Shaper, Open-Side, Improved, 26- and 36-Inch

Whipp Machine Tool Co., Sidney, Ohio. [Vol.65,p.505]

In this open-side planer, the table is oscillated by means of the usual slotted crank mechanism employed for shapers. Hence, reversal of motion takes place within the machine, and a single-



direction pulley or motor is used to drive it.

The base of the machine is a box section strengthened with cross ties. The column is a hollow tube and is also internally ribbed. The cross rail is also a box section, and is heavy and stiff. It is clamped rigidly to the column.

The machine is controlled by means of a dry-plate clutch that incorporates a brake, which is automatically applied when the clutch is released. It is said that the combination is powerful enough to start and stop the machine in the middle of the heaviest cut that it can take. The drive of the machine is either by means of a single pulley or by direct motor. In the latter case the motor is mounted on a bracket on the table and drives by means of a silent chain.

The table travel is 26½ in. and 36½ in., respectively. The total down feed is 9 in., while the total cross feed is 25 in. The maximum horizontal feed is ⅝ in. per stroke, while the maximum vertical feed is ¼ in. in both cases. Strokes ranging from 7 to 54 per min. in the case of the smaller machine and from 5½ to 43 per min. in case of the larger machine are provided.

— 118 —

Shaper, "Auto-Oiled"

American Tool Works Co., Cincinnati, Ohio. [Vol.65,p.423]

The shaper illustrated has been increased in both weight and power, and an automatic oiling system has been provided. Many other changes have also been made to the essential features of the machine. In order to avoid a loss of power, the number of gears and shafts has been reduced to a minimum. All high-speed shafts are

mounted upon Timken roller bearings.

The drive is through a four-speed gear box attached to the shaper column at the rear. Back gears are located inside the column, and by means of them two additional speeds can be obtained.

The rocker arm is of box form and is heavily ribbed. It is connected to the ram through a double link, designed so as to pull the ram down on its bearings during the entire cutting stroke. The ram is of the V type and is provided with wide guides. A combined clamp and gib is provided to take up wear. The ram ways in the column are heavily reinforced and the bearing surfaces are chilled.

The base has been increased in size and has been extended to the front of the machine so as to provide a pad for the table support.

The cross feed for the table is automatic, and nine speeds can be obtained. The feed takes place during the entire return stroke of the ram. Power down feed on the tool slide can be provided extra, with ten rates of speed ranging from 0.005 to 0.050 in. per stroke of ram.

The machine is regularly driven by a motor mounted on a substantial bracket or base bolted to the shaper column.

— 119 —

Shapers, "Steptoe"

Western Machine Tool Works, Holland, Mich. [Vol. 65,p.1082]

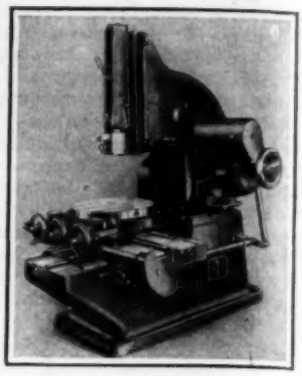
This company has purchased the entire shaper assets of the John Steptoe Co., Cincinnati, Ohio, and will continue the manufacture of this complete line of Steptoe shapers, ranging in size from 14 to 24 in. The machine can be arranged for cone pulley drive or motor drive, as desired.

— 120 —

Shaper, Vertical, Model B, 12-Inch

Pratt & Whitney Co., Division Niles-Bement-Pond Co., Hartford, Conn. [Vol.65,p. 575]

Operating convenience and the range of speeds and feeds are the outstanding features claimed for the Model B 12-in. vertical shaper. It can be furnished with either a built-in motor drive or a constant-speed belt drive. When arranged for motor drive, a 5-hp. constant-speed motor is mounted inside the bed. Four speeds and a neutral position are provided by a gear box. Power to the ram is delivered through a



large slotted eccentric and follower block.

The ram slide is hinged at the top and has a screw adjustment at the bottom, so that it can be set to any desired angle up to 5 deg. and locked in position. The stroke of the ram can be varied from 0 to 12 in. by a locknut adjustment. The speeds obtainable are 22, 37, 56 and 90 strokes per minute.

Power feed for the entire machine is obtained from a feed cam on the upper right-hand side of the column. The feed gear box, located directly below the table, provides forward, neutral and reverse feeds.

The rotary table is 24 in. in diam. and is mounted on longitudinal ways on the carriage. A total travel of 25 in. in either direction is provided. The table has four indexing notches for quick setting of surfaces to be machined at right angles. The available feeds are from 0.0021 to 0.0833 in. for the traverse and longitudinal travels, and from 0.043 to 0.1745 in. on a 10-in radius for the rotary motion of the table.

Presses

— 121 —

Presses, Power, "Reclinable" Type 36

Zeh & Hahnemann Co., 182 *Vanderpool St., Newark, N. J.* [Vol.65,p.426]

This improved line of "reclinable" power presses supersedes the inclinable presses previously marketed by this firm. The improved presses have been designed to afford greater strength, and they can be reclined to an angle of 40 deg. The frame is pivoted in front and the height of table remains the same in all positions.

The clutch is of the non-repeatable, or single-stroke type. A finger guard is also provided for additional safety, and a treadle guard protects the treadle against falling pieces that might cause an accidental stroke. The flywheel is of the disk type. The larger sizes have an automatic releasing brake.

Lugs for tierods are provided on the larger presses, making them suitable for heavy stamping work. Presses are furnished with an adjustable stroke on special order.

The type 36 "reclinable" presses are built in seven sizes: Nos. 2, 3, 4, 4½, 5, 6

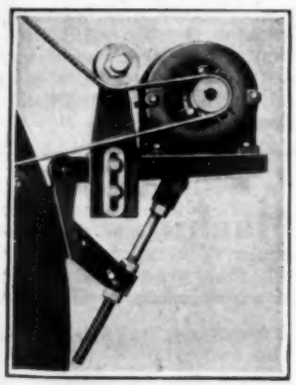
and 7. By squaring the number, the normal capacity of the presses in tons is obtained. The net weight of the smallest size, No. 36-2, press is 650 lb., and the floor space is 24x28 in. The weight of the largest, No. 36-7, geared press is 7,000 lb., and the floor space occupied is 52x60 inches.

— 122 —

Presses, Individual Motor Drive

Federal Press Co., Elkhart, Ind. [Vol.65,p.574]

Individual motor drive can be furnished for the complete line of open-back, inclinable presses made by this company. The motor bracket can



easily be attached to the back of the uprights, and can be supplied to take any electric motor of standard made.

The drive from the motor to the flywheel is through a leather belt. Since the bracket is attached to the part of the press that is adjusted for position, the length of the belt remains constant for any position of the back. The motor bracket can be adjusted so that it will be level when the press is in an inclined position.

— 123 —

Presses, Long-Stroke

Ferracute Machine Co., Bridgeton, N. J. [Vol.65,p. 1084]

This company has placed on the market a series of presses having long strokes and other special features. The press shown is the fifth in the series. The stroke of the ram is 12 in., and the distance from the bed to ram is also greater than usual.

The bed is adjustable. In its highest position its height from the floor is 33 in., from

which it has a downward adjustment of 8 in. When not in use the bed may be swung out of the way. Heavy bolts secure the bed to the frame and planed guides at the back insure positive alignment.

The flywheel and gear is webbed and incased in guards. The press is equipped with a motor shelf adapted for use with this type of drive. A horn set in the horn-hole at the front of the frame allows the machine to be used for such operations. While the press has been designed for certain forming operations in an automotive factory, it is adapted for a wide range of work. The total weight of the press is 15,000 pounds.

— 124 —

Punch, Single-End, Heavy-Duty, No. 12-A

Beatty Machine & Manufacturing Co., Hammond, Ind. [Vol.65,p.262]

The No. 12-A heavy-duty, single-end punch illustrated is intended primarily for the punching of splice bars and tie plates. It has a capacity of 750-ton ram pressure.

The drive is from an electric motor through straight spur gears and then through a herringbone pinion and gear. Both the pinion and the gear are made of cast steel, and each has a 12-in. face. The large gear is 96 in. in diam. All main shaft bearings are bronze bushed and the ways for the slide or ram are bronze lined. The main shaft is square at the clutch so that the clutch has a 4-sided bearing on the shaft.

The table measures 21x55 in., while the face of the slide is 15x37 in. The depth of the stroke from the ram to the face of the housing is 15½ in. The stroke is 2½ in. The shipping weight of the machine is 72,000 pounds.

— 125 —

Press, Garage, Two-Speed

Ernest Holmes Co., Chattanooga, Tenn. [Vol.65,p.33]

The two-speed garage press is an arbor and forcing press. It has a one-piece frame made from channel steel mounted vertically on an angle-section base. Four bracing members are used to secure rigidity. The bolster is supported in position by means of two pins which are inserted in holes in the columns. Two counterweighted cables are used to support the bolster when changing its position. Various fixtures can be used so that the press can be used for forcing, straightening and bending as well as

for arbor and general press work.

The head of the press has a double unit for high and low speeds with corresponding capacities of 4,000 and 60,000 lb. Lever action is used to supply the high speed movement of the ram which is returned by springs. The low speed, high pressure movement is obtained by means of a screw and bevel gears, operated through a large spider wheel. The thrust is taken by a ball bearing immersed in oil.

The distance between uprights is 32 in., and the space available under the arbor is 4 ft. 10 inches.

— 126 —

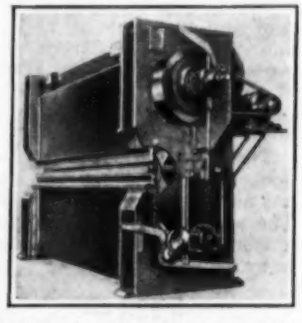
Press Brake, Gap, Double-Housing

Dreis & Krump Manufacturing Co., 74th St. and Loomis Blvd., Chicago, Ill. [Vol.65,p.1006]

The double-housing, gap press brake is made in various lengths for handling plate up to 14 ft. in length and with capacities to bend steel plates up to ½ in. in thickness. The machine operates on the toggle principle, whereby pressure increases at the bottom of the stroke where the final bend is made.

The drive is direct from a motor mounted on the rear of one of the columns. Texrope is used to transmit the power between cast-iron sheaves, and the flywheel rotates on Timken roller bearings.

Each housing is constructed of two steel plates, spaced with heavy channels, between



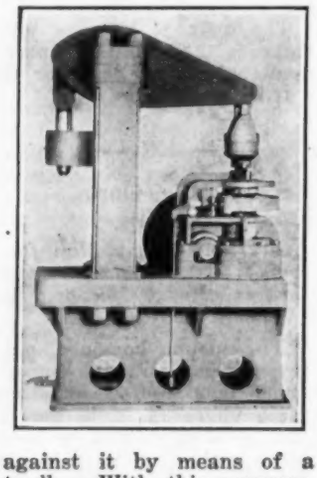
which is the driving mechanism. A bronze ring is mounted on an eccentric which is shouldered into the bull gear. This eccentric actuates a steel connection strap that drives against the toggle and operates the ram. The toggles are so located that the ram cannot be jammed on dead center. The ram slides in heavy steel guides, lined with phosphor bronze.

— 127 —

Press, Forcing, Power, Flexible

General Manufacturing Co., Detroit, Mich. [Vol.65,p.1090]

The 60-ton flexible power forcing press operates on the same principle as other flexible power units made by this company. The drive is by a worm and wheel to a screw jack, the nut of which is allowed to revolve free until a brake band is applied



against it by means of a tredle. With this arrangement, the operator can apply a few pounds on the ram or the entire capacity of the machine, depending on the amount of pressure applied to the foot pedal. Upon release of the pedals, the ram returns to its up or normal position.

Power to the ram is applied through a rocker arm, having a leverage ratio of 2½ to 1. The ram has a total stroke of 4 in. and operates at a speed of 48 in. per minute. The maximum distance between the up position of the ram and the table is 21 in., and the distance from the center of the ram to the front of the column is 6¾ in. The table is 24 in. wide and 30 in. high.

The machine occupies a floor space of 36x60 in. and has an overall height of 88 in. The net weight of the belted model is 6,600 lbs. The drive is by a pulley.

— 128 —

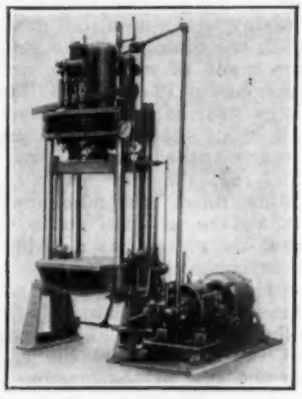
Press, Hydraulic, 50-Ton

Charles F. Elmes Engineering Works, 1001 Fulton St., Chicago, Ill. [Vol.65,p. 509]

The 50-ton hydraulic press illustrated operates in conjunction with a Hele-Shaw hydraulic pump direct-connected to a 7½-hp. electric motor.

The differential ram principle is used on this machine to obtain high speed of operation. Two minor cylinders and one large cylinder are employed in parallel.

An automatic stop releases the pump pressure at the completion of the return stroke, and a device is provided to maintain the ram in the top position even though the pump be idle. The maximum opening under



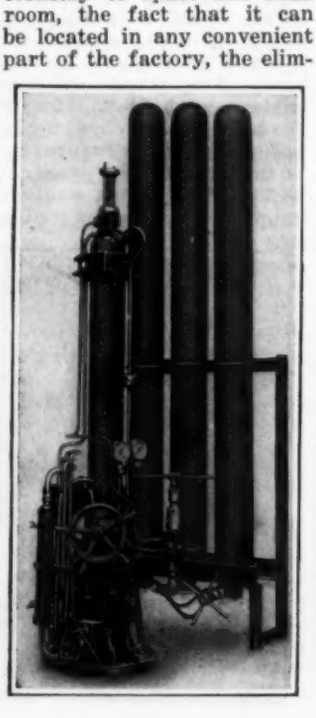
the ram is 27 in., while the maximum travel is 18 in. The platten measures 24x30 in. The machine occupies a floor space of 4 ft. x 5 ft. 10 in. and has an overall height of 8 feet.

— 129 —

Accumulator, Hydraulic

Charles F. Elmes Engineering Works, 1001 Fulton St., Chicago, Ill. [Vol.65,p. 546]

Advantages claimed for this accumulator are the economy of space and head room, the fact that it can be located in any convenient part of the factory, the elimination of hydraulic shocks and the usual troubles from such sources, closer regulation of pressure, and uniform delivery of pressure. The complete installation comprises an accumulator cylinder, a battery of compressed air storage tanks, a high-pressure pump and an air compressor. All pipe connections are of high-pressure steel. The function of the compressor is to charge the system and to make up for losses of air.



The accumulators can be supplied in pressures ranging from 300 to 8,000 lb. per sq.inch.

— 130 —

Motor Bracket, Press

The Standard Machinery Co., Auburn, R. I. [Vol.65, p.805]

The trunnion-mounted motor bracket allows a portion of the weight of the driving motor to be applied against the pull of the belt, so that

the latter is always under a uniform tension, regardless of its natural stretch.

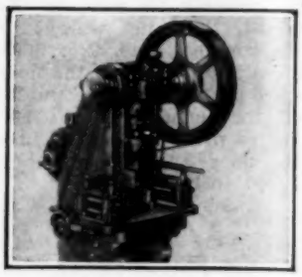
The use of this bracket obviates the necessity of shortening the belt or using an idler, the shifting of the bracket by gravity automatically compensating for the stretch of the belt. The motor bearings are also insured thereby against undue overload.

— 131 —

Roll Feed, Press

Standard Machinery Co., Auburn, R. I. [Vol.65,p.851]

A double-roll feed for punch presses, by which the space before and behind the tools is not obstructed by shafts or connecting links, is



applied to any of presses of the open-back type manufactured by this company.

The feed is operated by a friction ratchet, the movement of which is derived from an adjustable crankpin in a disk keyed to the end of the press shaft. The ratchet wheel is keyed to the end of a transverse shaft that extends behind and below the level of the die-bed. Movement of this transverse shaft is transmitted to both pairs of rolls through helical gearing.

Threading Machines

— 132 —

Tapping Machine, Automatic, No. 1

Frew Machine Co., 124 West Venango St., Philadelphia, Pa. [Vol.65,p.185]

The capacity of the No. 1 automatic tapping machine is ¼-in. U. S. Standard tap in cast iron or steel, ¼-in. pipe tap in cast iron, and ¼-in. pipe tap in steel. Motor drive is shown but the machine can also be driven from an overhead countershaft.

The spindle is carried in bronze bearings that support it for almost its entire length, and two friction pulleys are carried on Timken roller bearings mounted outside of the bronze spindle bearings, which are relieved from the radial load of the belts. A stop is provided on the end of the spindle to regulate the depth of tapping. The operator starts the tap in the work and the rest of the cycle is automatic.

For motor drive a hinged base is attached to the machine so that the belt tension is maintained automatically. The motor is rated at 1 hp. at 1,200 r.p.m. The table

measures 11x18 in. The maximum distance under the chuck is 19½ in. The maximum depth of tap is 1⅝ inch.

Multiple spindle heads can be attached, or two or three tapper heads can be mounted on a special base. A foot lever attachment can be furnished extra.

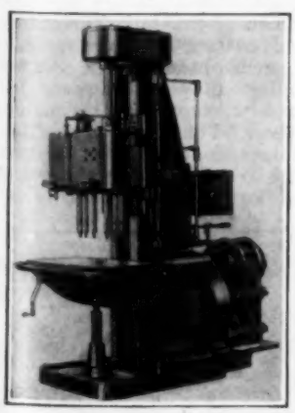
— 133 —

Tapping Machine, Multiple-Spindle, No. 10

Defiance Machine Works, Defiance, Ohio. [Vol.65,p.221]

The No. 10, multiple-spindle, fixed-center tapping machine illustrated was designed as a single-purpose production machine to meet the requirements of gas engine manufacturers for tapping spark plug holes and similar work. The production claimed is from 30 to 45 tapped blocks per hour.

The fixed-center head carrying the spindles is built with 4, 6 or 8 spindles, spaced to suit the requirements of the purchaser. A feed mechanism operates the head up and down on the slide, and a maximum travel of 12 in. is available. Adjustable stops are provided to regulate the travel. The spindle head can



be stopped or reversed at any position, but reverses automatically at the bottom of the travel and stops automatically at the top of the stroke.

The working surface of the table measures 20x36 in., while the maximum open space between the nose of the spindle and the top of the table is 32 in. The machine has a direct-connected motor drive controlled by a push button, automatic trips and cut outs. A 10-hp. reversible motor with magnetic reversing switch is the standard equipment.

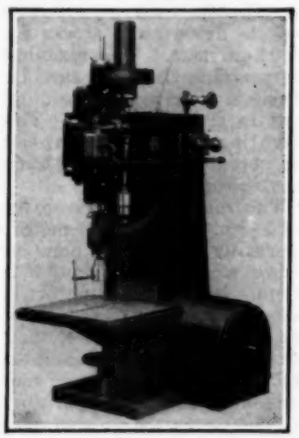
The floor space occupied by the machine is 33x66 in. The net weight of the 4-spindle machine is 5,800 lb., and that of the 6-spindle machine is 6,000 lb., while that of the 8-spindle is 6,200 pounds.

— 134 —

Tapping Machine, Pneumatic

W. H. Simmons & Co., 208 *Lawrence St., Cincinnati, Ohio.* [Vol.65,p.849]

The pneumatic tapping machine is designed for high production operation. The



capacity of the machine is for tapping holes ⅝ in. in diam. in steel and ¾ in. in diam. in brass and other soft metals. It is built in a bench type with a single spindle.

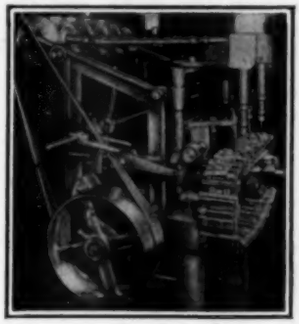
Spindle speeds up to 3,000 r.p.m. are available. Reversal is done automatically by means of compressed air. The maximum stroke of the spindle is 1½ in., and the minimum ½ inch.

— 135 —

Tapping and Drilling Machine, Automatic, "Meyer"

Boeger-Meyer Machine & Tool Co., 61 *McWhorter St., Newark, N. J.* [Vol.65,p.967]

This automatic tapping and drilling machine has been developed for production



work. In the set-up pictured four previously-drilled holes are being tapped in cast iron with a No. 10 tap, 32 th. per in. Twenty-five pieces are completed per minute or 1,500 per hr. When the machine is used for drilling about 1,000 pcs. per hr. are finished. Four spindles are shown but any number from one to six can be obtained with this machine. A feature of the machine is a feed conveyor of the endless-chain type. The operation is entirely automatic being controlled by cams, and the only function of the operator is to load the feed belt.

The conveyor chain is carried around two sprockets, one of which is driven intermittently by means of a Geneva stop mechanism. The spindles are each driven by means of a pair of friction disks. Simultaneous shifting of the friction disks to obtain reversal is accomplished by means of an adjustable cam.

From each friction wheel the motion is transmitted to a corresponding spindle by means of a telescoping shaft with universal joints at each end. The position of the spindle can be adjusted to cover any point within the area of the feed plate. The vertical movement of the spindles is controlled by means of an adjustable cam also. The chucks holding the taps have a vertical float so that the taps are not forced.

The machine can be driven by a belt or by an integral electric motor.

— 136 —

Tapper, Portable, Electric, No. 2

Van Dorn Electric Tool Co., Cleveland, Ohio. [Vol. 65,p.805]

The No. 2 portable electric tapper is for use on such

jobs as can be handled faster and more economically by taking the tapper to the work. It is particularly suited for fitting splash pans on machine tools, for putting dust covers on electric motors, and for similar classes of work.

The tapper is equipped with a heavy-duty universal motor. Sufficient power is provided to tap a ⅜-in. hole in cast iron, a ¼-in. hole in steel, and a ½-in. hole in aluminum and brass. The forward no-load speed is 340 r.p.m., while under rated loads the forward speed is 200 r.p.m.

Only a slight pressure on the spindle is necessary to drive the machine forward. It automatically reverses at double speed when a slight backward pull is placed upon the handle. The weight of the machine is 8 pounds.

— 137 —

Tapper, Portable, Electric, No. 1 and 2

The United States Electrical Tool Co., Cincinnati, Ohio. [Vol.65,p.852]

The mechanism in the portable tapper is designed so that the clutch automatically reverses when the operator

gives a backward pull on the handle. During the tapping operation this clutch has a positive engagement, but upon reversal the engagement is by friction clutch. This feature is said to eliminate tap breakage.

— 138 —

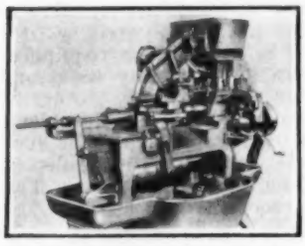
Threading Machine, Cap-Screw and Bolt, Automatic

Kent Machine Co., 268 *N. Water St., Kent, Ohio.* [Vol. 65,p.225]

The cap screw and bolt threading machine illustrated is built in two sizes. The machine may also be adapted to the threading of special bolts. It is automatic in action, and is adjustable to accommodate the specified range of sizes.

The hopper is so designed that the only change needed for different sizes is in the agitating plate in the center of the hopper. The chute from the hopper delivers the

cap screw blank to the holding jaws, where it is held by the head. An internal trip on the diehead regulates the length of thread on the screw. When threading bolts, the piece is held on the clamping



jaws by the shank, so that the thread is cut concentric with the shank.

After the blank has been fed to the threading position the diehead is automatically advanced, and when finished the diehead automatically opens and backs off the blank. The finished product is positively ejected from its threading position by an incoming blank.

The machines are belt-driven, with countershaft. The smaller machine is arranged for handling cap screws up to ¾ in. in diam. and up to 3¼ in. under the head, while the larger machine handles cap screws above ¾ in. in diam. and will thread screws 4 in. under the head.

— 139 —

Bolt-Pointing and Threading Machine, Automatic

Economy Engineering Co., Willoughby, Ohio. [Vol.65, p.308]

The automatic bolt-pointing and threading machine, illustrated, has been redesigned and improved. Also another size has been added to make a total of three. The machine can now be supplied, if desired, with a right-angle drive with a tight and loose pulley mounted on Timken roller bearings.

A bolt bucket has been attached to the side of the base. The work drops into a pan in the bucket and the oil drains through holes in the bottom. Positive drive has been provided for the hopper-operating crank with a relief device

between the crank and the hopper. The hopper itself has been increased in size.

The blanks pass from the hopper through a chute and are transferred mechanically to the chuck. The turret has three stations, loading, pointing, and threading. The pointing head is spring actuated and when the operation is completed the head is returned against the tension of the spring. Two separate cams produce the four movements through which the die head passes in the threading operation.

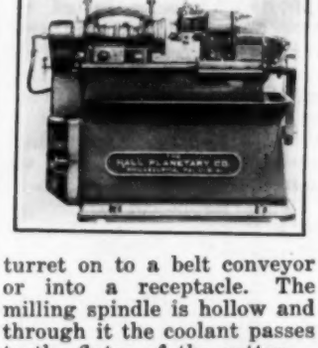
Change gears are provided to permit the machine to handle different classes of work. The lead cams, also, can be changed to suit the work. No. 1 machine threads bolts from $\frac{1}{16}$ to $\frac{3}{4}$ in. in diam. and from 1 to 4 in. in length; the No. 2 machine, from $\frac{1}{4}$ to $\frac{7}{8}$ in. in diam. and from 1 to 4½ in. in length; the No. 3 machine, from $\frac{3}{4}$ to $\frac{3}{4}$ in. in diam. and from 1¼ to 5½ in. long.

— 140 —

Thread Milling Machine

Hall Planetary Co., Fox St. & Abbotsford Ave., Philadelphia, Pa. [Vol.65,p.224]

This automatic planetary thread milling machine is designed for handling work of any shape. The pieces to be milled are placed in a large hopper from which they are fed into a revolving turret and are chucked. When the thread is milled the part is thrown out of the



turret on to a belt conveyor or into a receptacle. The milling spindle is hollow and through it the coolant passes to the flutes of the cutter.

The machine is especially designed to handle such operations as milling cap screws of hard steel, which would be difficult to tap. It is claimed that the milling cutter will not tear the threads and will produce accurate threads with a fine finish. A production of from 8 to 12 threads per min. is claimed for this class of work.

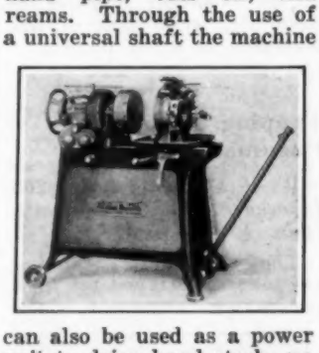
The head of the machine is bolted directly to the bed, thus eliminating sliding ways and gibs and making a more rigid construction between the cutter and the work. The motor drive is located in the base under the head and is connected to the spindle by a silent chain. Ball bearings are used throughout.

— 141 —

Pipe Threader, Portable, "Red-E-Hall"

Hall-Will, Inc., Erie, Pa. [Vol.65,p.184]

The "Red-E-Hall" portable pipe threader is for use in threading ¼ to 2-in. pipe and ¼ to 1¼-in. bolts. The machine threads right- and left-hand pipe, cuts off, and reams. Through the use of a universal shaft the machine



can also be used as a power unit to drive hand stocks up to 12-in. size. The machine is portable but it can be changed over to a stationary unit in a few minutes. The elevating truck mechanism for portable operation is built into the machine.

The machine is driven by a 1-hp. reversible motor, operating at 1,750 r.p.m. on either a.c. or d.c., through a silent chain. The motor is bolted directly to the frame underneath the bed. A turn button control is attached to the outside of the frame convenient for the operator. A friction clutch is also provided for stopping and starting. Three speeds are available by means of a selective slide transmission with a neutral position between each geared position. All shafts are mounted on Timken roller bearings.

Graduations are placed on the outside of a cam for setting the die-head for various sizes of pipe. It is said that the locking device on the head is simple and positive so that the head cannot open or shut while the thread is being cut.

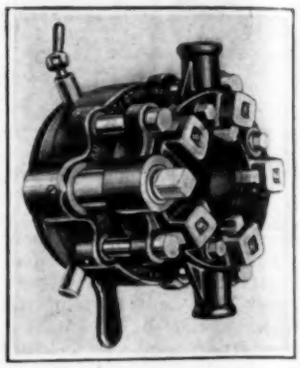
Four sets of chasers are required to cover the complete range of the machine. The spindle speeds are 19, 34 and 69 r.p.m. The carriage travels 11 in. The shortest length of pipe the machine handles is 7 in., while the shortest length threaded is that of a close nipple.

— 142 —

Pipe Threader, No. 44, "Receder"

Oster Manufacturing Co., Cleveland, Ohio.. [Vol.65,p. 346]

The No. 44 "Receder" pipe threader illustrated is intended to handle all sizes of pipe ranging from 2½- to 4-in. nominal size. The dies are narrow and are ground with an extra long lead and



sharp rake in order to produce easy cutting qualities. For the same reason the tool is geared and is furnished with a ratchet handle so that one man can cut a 4-in. pipe without much effort. A heavy leader screw is used to start the dies in the pipe and to pull them along so that the proper pitch and taper is produced. The screw is protected by a patented chip shield.

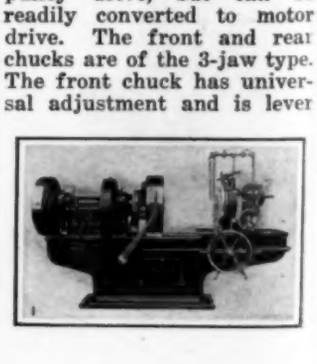
It is possible to cut both under- and oversize threads as well as standard threads with this tool. A lever-operated, self-centering chuck is used to hold the pipe.

— 143 —

Pipe Threading and Cutting-Off Machine, 4-Inch

Landis Machine Co., Waynesboro, Pa. [Vol.65,p. 574]

The 4-in. pipe-threading and cutting-off machine has a gear box and a single pulley drive, but can be readily converted to motor drive. The front and rear chucks are of the 3-jaw type. The front chuck has universal adjustment and is lever



operated, thereby permitting work to be put in and taken out without stopping the machine.

The carriage supports the cross rail, on which are mounted the dieheads, the centering jaws, the cutting-off tools and the reaming tool. The cutting-off tools are mounted in diametrically opposed holders and can be adjusted horizontally for centering the tools. A reaming device is also attached to the slide carrying the cutting-off tool.

The range of the machine is from 1 to 4 in. and is covered by two die heads. The die heads float horizontally on the cross-rail and are equipped with Landis chasers. The machine has eight speeds. The carriage travel is 24 inches.

Other Machines

— 144 —

Bending Roll, Plate, Horizontal

Lake Erie Engineering Corp., Buffalo, N. Y. [Vol. 65,p.428]

This improved horizontal plate-bending roll is of pyramid type, and was designed especially for boiler plate work.

The rolls are made of forged steel. The two bottom rolls are fitted with lining grooves for squaring the plate. Intermediate steady-rest trunion rollers are used

to minimize deflection under load. One end of the top roll is extended to form a balancing bar for supporting the roll when the outer bearing is dropped to remove the formed shell. A screw jack is connected to each top bearing cap through a tension link for adjusting the position of the roll.

The main drive for the rolls is from a 75-hp. motor, coupled to an inclosed herringbone reduction-gear unit running in oil. The two lower rolls are geared together by means of large spur pinions. The machine is 33 ft. 6 in. in length, 7 ft. 2 in. in width, and 9 ft. 7½ in. in overall height. It weighs approximately 130,000 pounds.

— 145 —

Bending Rolls, Plate, Medium-Duty

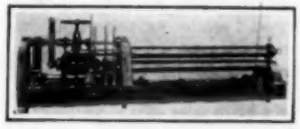
Wickes Brothers, Saginaw, Mich. [Vol.65,p.728]

The medium duty plate-bending roll has a capacity for rolling mild steel plate up to ¼ in. in thickness by 6 ft. in length to a circle 24 in. in diam. The rolls are arranged in pyramid form, the two lower rolls being gear driven, and the upper rolls being friction driven from the plate.

The top roll has a balance bar with an adjustable supporting shoe, and the removable bearing at the tail end has a knockdown housing so that plates rolled to complete circles may be easily removed. The front lower rolls can be slotted for use in flanging.

The lower roll has an independent driving gear and pinion. The journals are staggered so that the rolls can be placed close together in order to bend the plates close up to the edge.

The upper roll can be raised



and lowered by means of a power device. In case of overload, the friction gears slip and the machine is not injured. Clutches are provided for each elevating screw by which either end of the upper roll may be raised or lowered independently of the other end, so that plates of conical sections can be rolled.

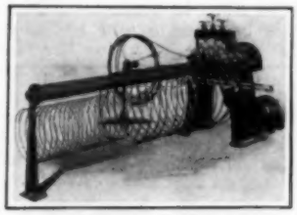
— 146 —

Bending Roll, Coil

Kane & Roach, Syracuse, N. Y. [Vol.65,p.970]

The coil bending roll illustrated has a capacity for coiling machine steel wire ranging from ¼ to ⅝ in. in diam., into a circle of any desired diameter with the same set of rolls. The machine can be arranged for direct connection to a motor or for belt drive. These coils are for use in reinforcements in cement conduits, sewer pipes and other concrete work.

The wire first passes through six straightening rolls to take out the kinks and bends. The upper straightening rolls are adjustable for various diameters of wires. The bending roll can also be adjusted for any required diameter of circle for bending, and in and out to regulate the width of spacing between the coils. In addition to the straightening and bending rolls, the machine is equipped with two lower side rolls that control the coil and keep it to a uniform diameter. These rolls are adjustable for diameter, and for different widths and spacings between the coils.



Where large diameter coils are required, the machine is equipped with a third lower roll located directly underneath the straightening rolls.

The arbor, which supports the coil, revolves, and is connected to the lower bending roll. It is supported by an outer bearing, which can be moved by hand, or can be mounted on a slide rail so that it can be quickly dropped to permit the arbor to be pulled out and the completed coil taken off.

— 147 —

Broaching Machine, No. 4 Special

J. N. Lapointe Co., New London, Conn. [Vol.65,p. 656]

The No. 4 special broaching machine has a maximum stroke of 102 in., and a pulling capacity of 73,000 lb. with 1,000 lb. per sq.in. of oil on the piston. The maximum speed of the cutting stroke is 15 ft. per min., and the speed of return is variable from 10 to 180 ft. per minute. Oil pressure to move the draw-rod is supplied by a Waterbury variable-delivery pump, coupled directly to a standard electric motor.

The weight of the outer end of the draw-rod is supported by a cross-head which slides upon the main frame. On the outward stroke the movement of the crosshead

is arrested by fixed stops, while the rod continues to move until the drawhead extends beyond the fixture so that the broach may be attached. On the cutting stroke the crosshead is picked up by a shoulder on the draw-rod and moves forward with it to the end of the stroke.

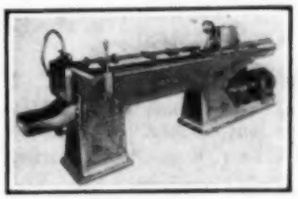
The end of the main frame has three machined bosses to which any kind of special work-holding fixture may be attached. As illustrated the machine is fitted to broach the splineways in long tubes of comparatively small diameter, and the fixture takes the form of a trough to return the oil or cutting compound to the tank in the base. A circulating pump provides a constant flow of cutting compound.

— 148 —

Broaching Machines, Hydraulic, Nos. 2-L and 2-S

The J. N. Lapointe Co. New London, Conn. [Vol. 65,p.888]

These hydraulic broaching machines are designed for work that does not require either the range or the pulling capacity of the larger No. 3-L machine made by this company. The two machines are alike except in respect to length of bed and length of



draw. The No. 2-L machine has a stroke of 48 in., and will accommodate a broach 52 in. long. The corresponding dimensions of the No. 2-S machine are 30 and 34 in. respectively.

The maximum rate of travel on the working stroke is 33 ft. per min. The movement may be stopped upon completion of the whole or any part of the stroke, or may be set to return automatically to the starting position.

The pulling capacity at an oil pressure of 1,000 lb. per sq.in. is 15,000 lb. The return stroke may be made at any rate below a maximum of 180 ft. per min. The hole in the faceplate is 5 in. in diameter. There is a vertical ad-

justment of the drawhead of 1½ in. above and below the line of center.

Power is supplied by a Hale-Shaw variable delivery pump direct-connected to an electric motor. A compensating reservoir is mounted above the cylinder and is open to the atmosphere.

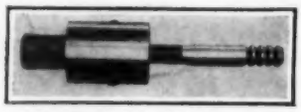
A Brown & Sharpe geared pump, driven from the motor, supplies cutting compound to the broaches. The reservoir for the compound is in the cabinet leg of the machine, and is provided with settling basins and baffle plates to keep the liquid clear.

— 149 —

Broach Puller, "Hy-Speed," Automatic

The Colonial Tool Co., 8432 *Butler Ave., Detroit, Mich.* [Vol.65,p.809]

The "Hy-Speed" automatic broach puller was designed for fast production on the high-speed hydraulic broaching machine. When the broach is inserted in the "Hy-Speed" puller, the two keys



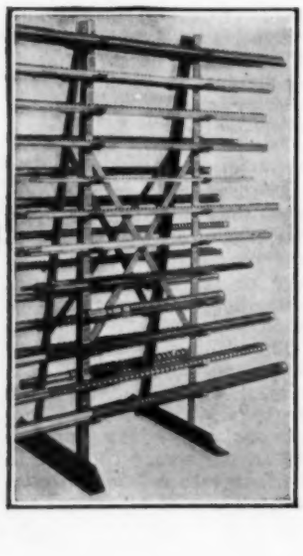
automatically drop into the flats of the broach shank, locking it into place. To remove the broach from the puller, the operator turns the broach a quarter way round, which pushes back the key so that the broach can be removed with ease.

— 150 —

Broach Rack

J. N. Lapointe Co., New London, Conn. [Vol.65,p. 1009]

This company has been using the broach rack here



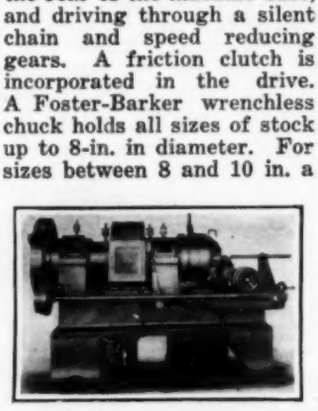
illustrated in its own shop and is now prepared to supply it to others. The rack is made of structural steel parts.

— 151 —

Cutting-Off Machine, 10-in.

Hurlbut-Rogers Machinery Co., Nassau, N. H. [Vol.65, p.302]

This cutting-off machine is capable of cutting off stock up to 10-in. in diameter. The machine is driven by a 7½ hp. multi-speed motor, mounted on a pedestal extending from the rear of the machine base, and driving through a silent chain and speed reducing gears. A friction clutch is incorporated in the drive. A Foster-Barker wrenchless chuck holds all sizes of stock up to 8-in. in diameter. For sizes between 8 and 10 in. a



special Skinner chuck is provided. There is also a steadying chuck at the rear end of the spindle.

The machine is equipped with the usual double tool slide, operated by means of a right-and-left-hand screw. A three-step cone on the feed shaft provides for different rates of power feed. The handles of the clutch and motor control box are conveniently mounted on the front of the machine. The machine including the driving motor occupies a floor space of 7x8 ft. and weighs 7,500 pounds.

— 152 —

Cutting-Off Machine, Multiple, for Hollow Stock

Hurlbut-Rogers Machinery Co., Nashua, N. H. [Vol.65, p.343]

This company has modified its 6-in. cutting-off machine adapted to cut off hollow stock or tubing in multiple cuts, in order to cut off rings for ball bearings or similar operations. The tool blocks are arranged to hold three or more ground cutting blades, separated by ground spacing blocks of the desired width, backed up by adjustable anvil screws. The cross-slides are moved by extra heavy right and left-hand screw.

The machine is arranged for a belt drive with spur gear speed reduction between the coneshaft and the main spindle. The coneshaft has a four-step cone for a 5-in. belt. Power feed on the cross-screw is available through a worm and wormwheel, operated by a feed shaft provided with a three-step cone. A Foster-Barker wrenchless chuck at the front end of the main spindle grips and drives the stock, which is centered and steadied at the rear end by a standard universal chuck. The machine occupies a floor space of 3x7 ft. and weighs 3,800 pounds.

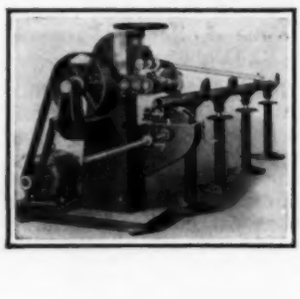
— 153 —

Cutter, Pipe and Tube, High Speed, "Steen"

The Continental Machine Co., 2002 *Clybourn Ave., Chicago, Ill.* [Vol.65,p.653]

The "Steen" pipe and tube cutter illustrated has a capacity for cutting pipe or tube ranging from ⅛ to 6 in. in diam. The machine is furnished with either belt or motor drive. The motor is mounted upon the base and drives the machine through a short belt and idler pulley. A 3 hp. motor at 1,200 r.p.m. is regularly provided.

The cutter arm is pivoted about the driving pulley as an axis, and the power is transmitted to the cutting blade through a gear train. The cutter is of the knife type and 7 in. in diameter. The cutter shaft and block rolls are mounted upon roller bearings. The blocks holding the rolls slide in guides along the table, and may be spaced to take care of different pipe diameters. The machine is



furnished with four pipe supports adjustable for height to take care of various sizes of pipes.

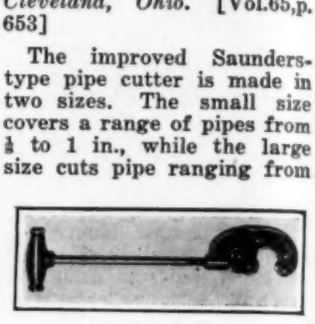
The swing cutter frame is counterbalanced with a weight and the cutter pressure is obtained by means of a lever which actuates a cam. The lever pivot is carried in an adjustable support to take care of the pipe sizes.

— 154 —

Cutter, Pipe, Saunders-Type

Oster Manufacturing Co., Cleveland, Ohio. [Vol.65,p. 653]

The improved Saunders-type pipe cutter is made in two sizes. The small size covers a range of pipes from ⅛ to 1 in., while the large size cuts pipe ranging from



⅛ to 2 in., nominal size. They can be used for either hand or power work.

The cutter wheel is of large diameter, and instead of being directly above the center of the two rollers it is placed slightly off center. With this construction, it is claimed that the tool will cut off pipe rapidly with little pressure on the screw. The handle is made of malleable iron, while the cutter wheel, the rollers and pins are made of high-grade tool steel. It is said that the tool will track readily when turned by a mechanical drive.

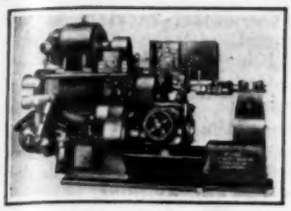
— 155 —

Cutting-Off Machine, 8-Inch

Bardons & Oliver, Cleveland, Ohio. [Vol.65,p.733]

The 8-in. cutting-off machine is designed especially for production work on steel tubing and bars. Two cutting off tool slides travel on a saddle mounted on the front end of the head, so that passage is left for the chips and lubricant to fall into the pan. The power feed is engaged by the operator's right hand, while the air chuck closing the collet is operated by his left hand. The cut-off slides feed in automatically, and at the end of the cut quick return motion brings them back. The slides are wide enough to carry several tool holders, both front and rear.

The collet jaws for the dif-



ferent sizes of stock are readily changed without removing the collet from the spindle. Its opening and closing is controlled by a four-way valve. The same motion that opens the collet brings the feed rolls into contact with the stock. The roller feed gear train is driven by a variable speed reversing motor, in order to control readily the rate and direction of feed of the stock.

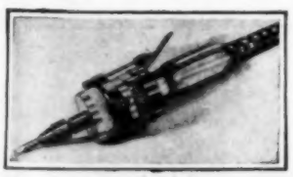
The driving motor regularly applied to this machine is rated at 15 hp. The 2½-hp. roller feed motor is provided with a reversing type controller. A ½-hp. constant speed motor drives the cooling pump. The machine occupies a floor space of 62x124 inches.

—156—

Hand Tool, Power-Driven, Types A and B

J. C. Edgecumbe & Co., 149 Broadway, N. Y. [Vol.65, p.187]

The "Flextol" power-driven hand tool is intended for screw driving, nut setting, drilling, boring, grinding, and buffing. The power unit consists of a ¼ to ½ hp. motor operating at 1,400 r.p.m., suspended in either a vertical or horizontal position from a



track supported upon the ceiling or other convenient place. Coupled to the armature is a flexible shaft that transmits power to the hand tool.

In the type A tool the final drive takes place through a train of epicyclic friction cones that have a reduction ratio of 5 to 1, giving a speed of 280 r.p.m. at the tool. The friction cones act as a clutch so that the tool does not rotate until pressure is applied. The driver bits can be readily attached to the tool. The type A tool weighs 2½ pounds.

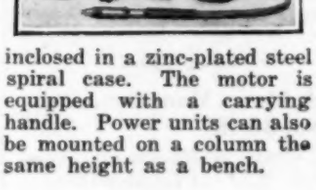
The type B tool is fitted with a three-jaw chuck, and is suitable for drilling holes in metal up to ¼ in. in diameter. In this case the chuck runs at motor speed. The tool has side handles, either or both of which may be detached or adjusted to the operator's convenience. The type B tool weighs 2¼ lb. Both types are interchangeable on the same shaft.

—157—

Power Unit, Flexible, No. 112A

Sirianni & Trumbettas Co., Carbondale, Pa. [Vol.65,p. 385]

The flexible power unit No. 112A illustrated is an improvement on the No. 112 unit, described on page 694 of Vol. 64 of the *American Machinist*. While the former unit was a single speed machine, the present model has three standard speeds, 700, 1,750 and 3,500 r.p.m., and by using special pulleys speeds as high as 22,000 r.p.m. can be obtained. The hand piece is regularly equipped with Superba ball bearings. The entire unit is mounted on a swivel base and swings in a complete circle. The motor is rated at ¼ hp. The core is a hard wire-wound cable, and it is



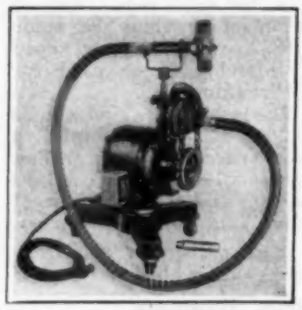
inclosed in a zinc-plated steel spiral case. The motor is equipped with a carrying handle. Power units can also be mounted on a column the same height as a bench.

—158—

Flexible Shaft Equipment, Type H-6, Improved

R. G. Haskins Co., 3446 Lake St., Chicago, Ill. [Vol. 65,p.546]

This company has made several improvements on its H-6 flexible shaft equipment, of which the caster base model is illustrated. The casing of the flexible shaft is of special construction. The inside is of flat tempered spring steel wound on a mandrill. Around this is tightly wound a layer of cord and one of fabric both impregnated with rubber, and with another flat steel spring on the outside as a protection against abrasion. Two heavy reinforcing springs have been placed at the motor and spindle ends. The casing ends are fastened onto the casings with compression prongs. The ends are threaded to receive the spin-



dle at one end and the motor coupling at the other.

At the spindle end a swivel coupling connection has been provided, so that the shafting will not break down when it is subjected to constant twisting and bending, in order to get the tool into angles and corners. With this fixture the spindle is free to swing in a complete circle.

The shafting on the equipment illustrated is driven through a two-speed cone pulley from a motor mounted on a three-footed base casting having casters on each of the feet.

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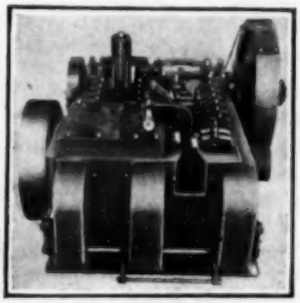
Forging and Upsetting Machine, Heavy-Duty

Acme Machinery Co., Cleveland, Ohio. [Vol.65,p.222]

This company is marketing an improved line of heavy-duty upsetting and forging machines in ten sizes ranging from ¾ to 5 inch. A feature of the machine is the all-steel construction. The bed is a one piece steel casting strengthened by deep ribs and trusses. The bed has three heavy main crankshaft bearings. The operating side is so designed that the operator can get close to the work.

The crankshaft has been increased in size from the older models. An improved cam on the shaft operates



the movable die smoothly and rapidly. It has a hardened tool steel face at the point where the work is heaviest. The cam also operates against large hardened steel rollers in a toggle slide. The machines are powerfully back-geared. A flywheel is keyed to one end of the driving pinion shaft and is provided with a friction relief in case the machine is stopped suddenly.

The header slide is suspended on long bronze bearing surfaces in recesses on top of the bed, so that dirt, scale and water is prevented from entering the bearing surfaces. The movable die slide is of steel, and has the same improved suspension as the header slide. The toggle slide is of two-piece construction. The lower part is carried on large wearing plates operating in the toggle slide ways. The top part carries the relief mechanism and also the hardened steel rollers on which the cam operates. A strong brake is also provided, which stops the machine in the proper position when the clutch is disengaged. All wearing parts of the machine are provided with bushings or wearing plates.

Motor drive is furnished with the machine when desired. On the 2 in. machines and larger the motor is placed on a bracket, which is bolted directly to the machine with a silent chain driving directly to the flywheel shaft. The ¾ to 1½ in. machines are gear driven from the motor located on a bracket at the rear.

—160—

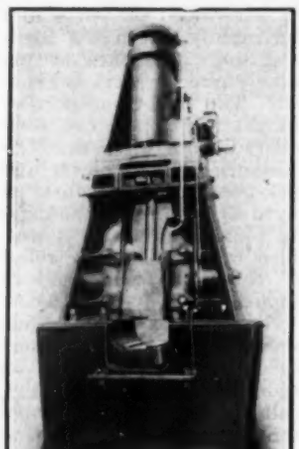
Hammer, Steam, Double-Frame, Type B

Chambersburg Engineering Co., Chambersburg, Pa. [Vol.65,p.613]

A series of Type B double-frame steam hammers ranging in size from 600 to 24,000 lb. are announced. The 5,000-lb. hammer is illustrated. The anvil is solid and the side frames have been designed so that their bases are on a line with the die-line instead of with the sow block, which is set well within the anvil to assure rigidity.

The tie plate locks with the side frames to prevent movement and a tongue and groove is used to maintain alignment. The cylinder block base is also locked to the tie plates.

A safety cylinder head on top of the cylinder contains a



piston of a slightly greater diameter than the ram piston, and is connected direct to the live steam line, so that a cushion is formed.

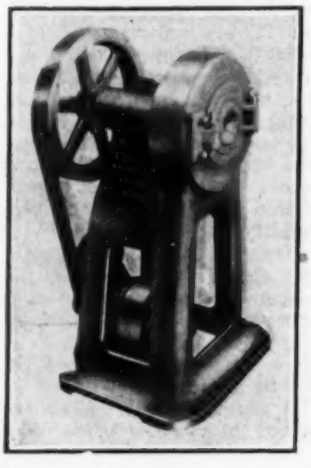
The guide for the hammer is supported by the frame in planed pockets and adjustment is provided by a steel taper shoe bearing full length and width against the guide. A one-piece cam actuated by the ram provides for automatic operation as long as the operator's foot is on the treadle. The stroke of the 5,000-lb. machine is 50 in. and it weighs 145,000 pounds.

— 161 —

Swaging Machine, Rotary, Improved

The Standard Machinery Co., Auburn, R. I. [Vol.65, p.730]

The improved rotary swaging machines are built with a cabinet base adapted to receive the driving motor, making the machine self-contained, more rigid, and reducing the floor space necessary. The spindle and die-head is one piece, hardened and ground all over. The dies and hammers are entirely enclosed by renewable wearing surfaces.



The machine is regularly built in nine sizes, ranging from $\frac{1}{16}$ in. to 6 in. for tubular work, or from $\frac{1}{16}$ in. to 3 in. for solid rods. Any of the machines may be made with a water-jacketed head if intended to be used for hot swaging.

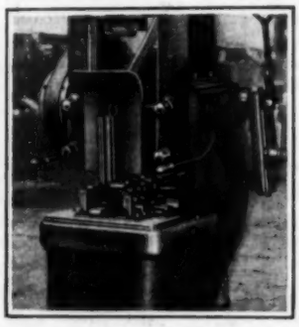
The largest machine weighs 15,000 lb., and occupies a floor space of 51x60 inches. The smallest machine weighs 140 lb., and covers a floor or bench space of 17x18 inches.

— 162 —

Drop Hammer, Automatic Feed for

The Standard Machinery Co., Auburn, R. I. [Vol.65, p.730]

The automatic feed movement for drop hammers is intended to be used in connection with coining, stamping, or similar work wherein the pieces are small and must be placed individually on the lower die. This feed relieves the operator of the necessity



for placing his hands in danger.

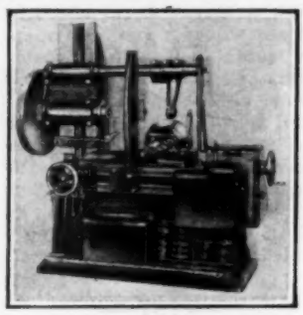
The feed movement consists of a carrier to move across the face of the die between the magazine and the impression in the die. The carrier comes forward under the stack of work in the hopper, receives the bottom piece of work, carries it to the die and deposits it in the impression. As the hammer rises after striking the blow, the carrier again picks up the work piece and sweeps it off the die at the back.

— 163 —

Gear Cutting Machine, Automatic, No. 4, Improved

Brown & Sharpe Manufacturing Co., Providence, R. I. [Vol.65,p.385]

The above company has made a number of improvements on its No. 4 automatic



gear cutting machine. The design is such that heavy work can be set up rapidly and at the same time a high degree of accuracy is maintained.

The most important improvement is in the method of supporting the gear blanks. The work spindle slide has been made heavier and it is equipped with a solid steel overarm, which clears gears up to 19¼ in. in diameter, and carries an adjustable work support head for the outer end of the work arbor. The heavy vertical brace gives additional support to the overarm. The work spindle slide also has a wider and heavier strap and gib. The side walls supporting the upright ways of the bed have also been thickened to provide additional support.

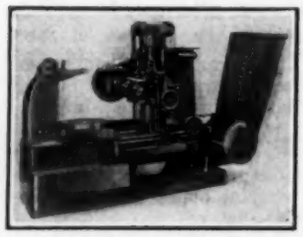
The feed screw that operates the cutter slide has been increased in diameter as has the index worm shaft. The outer bearing of the cutter spindle is a tapered bronze bushing, so that adjustment can be made to compensate for wear.

— 164 —

Hobber, Manufacturing, No. 36-HS

Gould & Eberhardt, Newark, N. J. [Vol.65,p.1081]

The construction of the No. 36-HS manufacturing hobber is similar to the smaller size machine, No. 16-HS. It will cut spur gears in steel up to 3-pitch, and



up to 36 in. in diam. on a production basis with an ultimate capacity of 42 in. in diam. The machine is especially adapted for the cutting of transmission gears.

The cutter carriage is arranged with power traverse of 100 in. per min. in either direction. The rapid power approach brings the hob to the cutting position where it is automatically stopped. The feeds may then be started by the operator tripping the feed lever. The power rapid reverse completes the cutting cycle. The diameter of the work table is 20 in. Stacked gear blanks with an aggregate face of 16 in. can be hobbed at one setting.

The drive of the machine is through a constant-speed pulley mounted on Timken roller bearings, and incorporating a plate-type clutch. All of the drive parts of the machine have been segregated in a case mounted on the base at the rear.

The design of the bearings is such that either spindle may be adjusted in place in the machine. A positioning device is also provided so that it is possible to shift the hob from a dull to a sharp position without taking it from the arbor.

— 165 —

Lapping Machine, Crankshaft, "Schraner"

Kenneth Ingersoll, Book Building, Detroit, Mich. [Vol.65,p.307]

The crankshaft lapping machine illustrated is manufactured by A. P. Schraner & Co., and is being marketed by the above party. The machine is intended for use on automotive crankshafts.

The bed of the machine contains the driving motor; a gear box for transmitting power to the headstock and

to the table oscillating mechanism, a kerosene tank and pump, and a lubricating oil pump. The table is mounted on ways on the bed with eccentric mechanism that oscillates the table back and forth the required amount. The upright housing at the rear of the machine is provided with ways for carrying the

tool saddle. The heads for lapping the line bearings are held in a fixed position with relation to the lower cross-rod.

The heads for lapping the crank pin bearings are only guided against the sidewise motion in relation to the lower cross rod. The upper part of the crank pin bearing heads carry vertical shafts that pass through fittings on the upper cross shaft. The fittings are held against sidewise motion but are free to run on the upper cross shaft.

The tool blocks consist of jaws that are opened and closed by means of individual levers. Each jaw holds two stones. The stones are of a fine grade and act both as a remover of stock and as a polishing agent. They are held against the work by constant spring pressure.

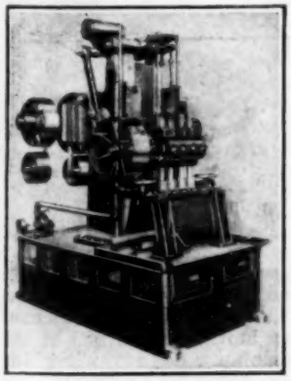
The headstock rotates the work at about 150 r.p.m. The machine automatically stops for reloading. A time dial is provided which can be set for any length of time necessary to produce the required results.

— 166 —

Lapping Machine, Multiple-Spindle, Automatic, No. 10 "Hole Hog"

Moline Tool Co., Moline, Ill. [Vol.65,p.928]

The "Hole Hog" No. 10 multiple-spindle automatic lapping machine has been developed to lap or hone automotive cylinders. It can be furnished with a proper



number of spindles and jigs for either a 4-, 6-, or 8-cylinder block.

The table of the unit is stationary, and the reciprocation takes place in the rail that carries the hone. The lapping tools are reciprocated a predetermined number of strokes and are then returned to the starting position and stopped. This cycle takes place automatically.

The chief function of the base of the machine is to provide a settling tank or reservoir for the kerosene or compound used as a coolant for the hones.

The entire head slides up and down in the guides on springs on the face of the column. Reciprocating motion is obtained through a balanced rocker arm driven by means of a special crank mechanism having two throws.

The length of the working stroke is adjustable from 4 to 6½ in. The position of the slide can also be adjusted by a right- and left-hand screw bar in the link that connects the rocker arm to the head. All reciprocating parts, such as the rail slide and head, are made of aluminum so as to give a minimum weight of reciprocating parts.

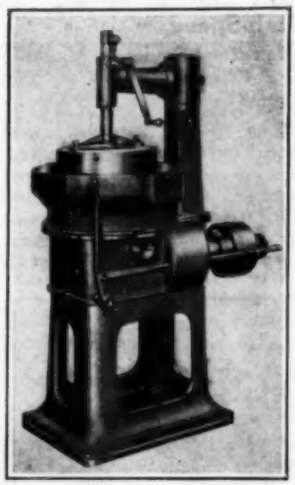
— 167 —

Lapping Machine, Flat and Cylindrical, No. 1-U

Bethel-Player Co., Westboro, Mass. [Vol.65,p.1046]

This machine was designed for the precision lapping of parts on a production basis where the quantity to be produced is not large enough to warrant the purchase of the larger standard machine. It is applicable to all small flat parts, such as gage-blocks, and disks, which must be of a definite and exact thickness with parallel surfaces, or to cylindrical work, such as plug-gages, measuring wires, and bushings.

The laps are of cast iron and are charged with lapping compound suitable for the work in hand. The lower lap revolves, while the upper



one is stationary, being loosely suspended from a spider attached to a lever-operated spindle by which the lap may be raised to load the work. The upper lap adjusts itself to inaccuracies of the work at the beginning of the lapping operation.

A circular plate, somewhat less in thickness than the work to be lapped, lies between the laps when in working position, and the work-pieces lie in cut-out openings in this disk. The disk is given a slow, gyratory movement which causes the work-pieces to be swept over the entire surface of the lap. The weight of this machine is 800 lb., and a floor space of 30x40 in. is required.

— 168 —

Polishing Machine, Portable

Mall Tool Co., 8389 *South Chicago Ave., Chicago, Ill.* [Vol.65,p.267]

The pedestal type portable polishing machine illustrated is intended for polishing curves or flat surfaces, but can also be employed for grinding, sanding or rubbing

operations. The flexible shaft is furnished either with right angle drive, as shown, or with a straight drive. The motor is 1 hp. operating a 3,450 r.p.m., and swivels on a steel pedestal. The swivel has a wide bearing surface for rigidity. The disks are made of rubberized fabric, and are furnished in various degrees of flexibility to suit the requirements of the work. Three disks are supplied with the machine.

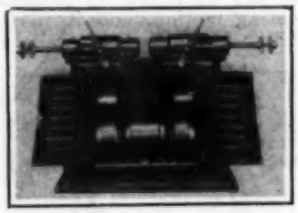
— 169 —

Buffer, Selective-Speed

Hisey-Wolf Machine Co., Cincinnati, Ohio. [Vol.65,p.692]

Each spindle of this buffer is driven by a separate motor pulley, and it is possible to stop either spindle independent of the other. An adjustable brake works in unison with the belt shifter and engages when the belt is shifted on the loose pulley. In this way the spindle is held stationary until the belt is again shifted. The belt tension can be regulated by means of adjusting levers and by the position of the motors, which are mounted on hinged platforms.

Ball bearings are used throughout and are provided with suitable means of lubrication. A full automatic mo-



tor starter with push-button control is standard equipment. The standard spindle speeds are 1,600 and 2,000 r.p.m., but speeds of 2,400 and 2,600 or 3,000 r.p.m. can also be furnished. If desired, spindles can be provided with a different speed on either end. The machine is made in three sizes with 7½-, 10- and 15-hp. motors.

— 170 —

Polishing Lathe, Motor Driven, No. 3-CA

Gardner Machine Co., Beloit, Wis. [Vol.65,p.813]

The motor-driven polishing lathe has the motor mounted on a hinged bracket at the rear of the base. The spindle is belted to the motor, and with this type of drive various spindle speeds can be secured. Because the motor is mounted on a hinged bracket the belt length need not be varied to take care of different sizes of pulleys. The

belt is fully inclosed in a sheet metal guard, and is locked tight at all times.

This construction is intended to conserve floor

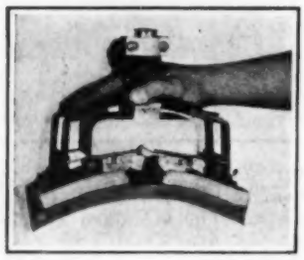
space. An alternating current motor is used, operated by means of a push-button station built into the base.

—171—

Rubbing Machine, Portable

Thompson Rubbing Machine, Inc., Binghamton, N. Y. [Vol.65,p.971]

The rubbing machine shown in the accompanying illustration, is intended for sanding, polishing and rubbing any surface either wet or dry by means of reciprocating motion, and its flexibility is claimed to make it



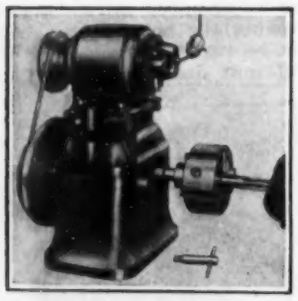
suitable for work on concave, convex, or flat surfaces. The machine is light in weight, and when counterbalanced with its driving equipment, only the weight of the rubbing head is carried by the operator. An electric motor furnishes the power through a flexible shaft.

—172—

Reaming Machine

Alto Manufacturing Co., 1647 *Wolfram St., Chicago, Ill.* [Vol.65,p.806]

The bench reaming machine is intended to take care of the simple production reaming that is usually done by hand. It has two reamer



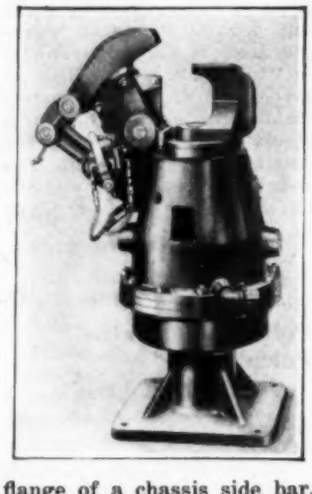
speeds, 30 and 60 r.p.m., and is driven by a ¼-hp. motor. The geared scroll chuck provided with the machine will take reamer shanks from ⅛ in to 1⅛ in. in diameter. The machine weighs 84 lb., and takes up a bench space of 9x11 in. The height of the machine is 18 inches.

—173—

Riveter, Closed-Yoke

Hanna Engineering Works, 1765 *Elston Ave., Chicago, Ill.* [Vol.65,p.656]

This closed-yoke riveter is especially suited for automotive chassis work. Its function is to drive the vertical rivet in the upper



flange of a chassis side bar, rail or channel to which the cross members are attached in the final assembly.

The inner lower swiveling die is horn shaped to hook around the lower flange of the channel, and to enter from the bottom of the chassis frame into the throat of the channel below the upper flange.

The riveter is mounted upon a swivel base which permits the entire machine to rotate about a vertical axis. It may also be equipped with a trunnion stand base, or a mounting that combines swivel and tilt is also available. The length of stroke is 1⅛ in. in a straight line.

Movement of the riveting mechanism is controlled by means of a foot operated valve. This riveting machine is available in three sizes of 10, 15 and 20 ton capacities for cold riveting of ¼, 5/16 and ⅜ in. rivets, respectively.

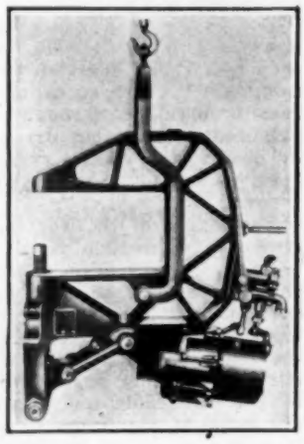
—174—

Riveter, Compression-Yoke, Portable

Hanna Engineering Works, 1765 *Elston Ave., Chicago, Ill.* [Vol.65.p.1086]

One of the features of the portable compression - yoke riveter is the alloy steel truss frame construction, which gives rigidity and strength with a minimum of weight. This riveter has a reach of 24 in., a gap of 15 in., and is capable of exerting a pressure of 50 tons on a rivet die at 100 lbs. per sq. in. air pressure. It weighs 1,500 pounds.

When the machine is sus-



pended as shown, the rivets are inserted from above and headed from below. The machine may also be suspended with the dies vertical and the cylinder up, or with the dies horizontal and the cylinder up.

The control of the intake and exhaust air is through a Hanna combination operating valve, which is operated either by hand or foot. The valve combines both a balanced poppet and a balanced piston type, so that it is both air tight and free moving. Any slight leakage from the valve will be from the machine to the exhaust.

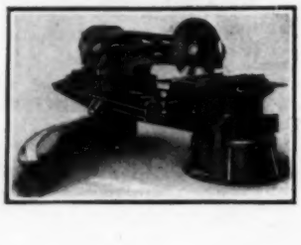
The pressure - exerting mechanism is the standard Hanna combination of simple lever and toggle which combines a long die stroke with a wide range of uniform pressure.

—175—

Saw, Cut-Off, Metal, High-Speed

Hunter Saw & Machine Co., Pittsburgh, Pa. [Vol. 65,p.427]

The No. 2 high speed metal cut-off saw illustrated, was developed for the rapid cutting off, mitering, and coping of the new Junior beams, and other similar sections, such as stair



stringers and various pressed and rolled metal sections.

The machine is mounted upon a turn table which permits it to be swung at any desired angle. The table is rotated by means of a crank handle at the front end of the machine. When the table is set at the desired angle, it is clamped in place.

The machine is equipped with a 24 in. toothed saw, belt driven directly from a motor. The motor and saw unit are mounted on a carriage that is equipped with rollers. The power feed is obtained by means of a hydraulic system, the pump and driving motor of which are mounted on the machine.

The saw arbor is mounted on double-row deep-groove ball bearings contained in an oil-tight and dust-proof housing. The belt and saw blades are protected by steel guards to conform with safety specifications. The motor is mounted on an adjustable base for obtaining the desired belt tension. It is rated at 15 hp., and any standard make can be supplied.

—176—

Cutting-Off Machine, "Milband," 6-Inch

Avey Drilling Machine Co., Cincinnati, Ohio. [Vol.65, p.579]

The "Milband" cutting-off machine has been designed for cutting off bar stock up to 6½ in. in diameter. The machine is of the band saw

type for continuous cutting, and is equipped with the "Aveymatic" feed mechanism built into the bed of the machine. By advancing the saw blade to the work, the feed is automatically engaged, and at the end of the cut the feed is automatically disengaged. Hardened guide rolls are attached to arms on both sides of the cut, and the work is clamped in a double vise on both sides of the cut. Three blades speeds of 176, 135 and 95 ft. per min. are available from one

lever operating sliding gears. The gear shafts and the flanged band wheels are all mounted upon ball bearings.

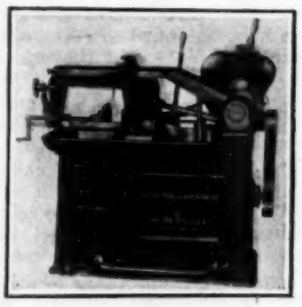
The regular machine has tight and loose pulleys, but it may also be arranged for belted motor drive with the use of any type of motor desired. A geared pump driven from the main drive shaft provides coolant to the blade. The capacity of the machine is for material 6½x 6½ in. in size. The number of selective feeds is 6, or 18 with extra change gears.

— 177 —

Saw, Production, "Shear-Cut"

Racine Tool & Machine Co., Racine, Wis. [Vol.65,p. 729]

The Racine "Shear-Cut" production saw for high-speed metal cutting is being built in 4 models: 2-belt-driven models with single and with three speed, and two motor-driven models



with single and with three speed. By means of an automatic screw-feed mechanism, the saw is progressively fed into the metal at a predetermined speed.

The feed is selected by placing the lever in the proper notch in the radius arm. A plate on the machine indicates the proper speed and feed for each class of work. After the cut is finished a clutch is automatically thrown out and the feeding device is released.

The rated capacity for all four models is 6x6 in. The stroke is 6 in., and blades 10, 12 and 14 in. in length can be used.

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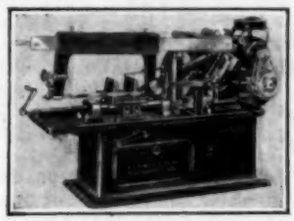
Metal-Cutting Machine, Improved No. 18, "Kwik-Kut"

E. C. Atkins & Co., Inc., Indianapolis, Ind. [Vol.65,p. 1007]

The No. 18 "Kwik-Kut" metal-cutting machine has integral motor drive with



the controller mounted on top of the motor frame, but a belt-driven model with a two-step cone pulley can be furnished. The two cutting speeds available are 50 and 80 strokes per minute.

The raising of the blade on the return stroke is accomplished by means of an oil-actuated dash pot as in previous designs. The saw frame and guide have been improved, and gibs are provided to take up possible wear.

The cooling system consists of a pump, tank, and catch basin, and the necessary piping contained within the base of the machine. A filter is used to remove the chips from the coolant.

The machine occupies a floor space of 60x26 in. with a maximum height of 40 in. above the floor. The net weight is 950 pounds.

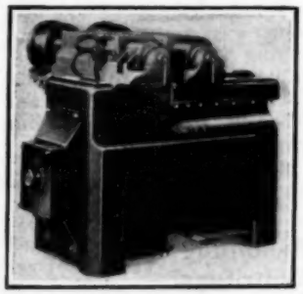
— 179 —

Welder, Electric, "Swift"

Joseph T. Ryerson & Son, Inc., Chicago, Ill. [Vol.65, p.263]

This machine was designed for safe-ending flues and for welding operations in reclaiming small pieces. With proper dies it can be used for any kind of butt welding. It may also be used for welding round or bar stock or for annealing, upsetting, heating and stressing.

The welding clamps are adjustable and are said to be flash and slag proof. They



slide on hardened steel guide plates and are actuated by a foot-operated air cylinder. Two pair of dies are used for each set. One set of dies handles work on both 2- and 3-in. tubes. On larger work a separate set of dies is required for each size of flue. A pressure cylinder is used to push up the work.

The welder is operated by means of a remote control system that consists of a contactor panel separately mounted and operated from a lighting circuit by a push button switch on the welder. The unit can be supplied for operation on 220-, 440- or 550-volt primary current, preferably of 60 cycles. The primary circuit is air-cooled, while the secondary circuit, dies and die blocks are water-cooled. The machine is rated at 150 kva. at 85 per cent power factor. It has a capacity for flues and tubes in any sizes up to 6 in. in diameter.

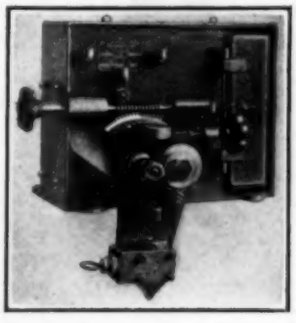
— 180 —

Seam Welder, Electric Arc, Automatic

Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pa. [Vol.65,p. 810]

The automatic electric-arc seam welder consists of a traveling "Auto" arc and a steel framework for carrying the arc and for holding the material in place. The welder will hold tanks or drums from 10 to 40 in. in diameter, and 8 ft. in length.

The section of the pipe or tank drum to be welded is inserted between the two sections of a clamping device, which is in the form of an extended arm balanced by a cast-steel base. The lower half of the clamping device contains air cylinders,



and a copper backing strip.

The "Auto" arc is mounted on a traveling carriage having 4 grooved wheels that move along a track on the extended arm of the tool. The "Auto" arc is propelled along this track by means of a ¾-hp. motor mounted on the arc base geared to the wheels of the traveling carriage. The "Auto" arc moves along the seam, automatically welding it. The motion can be reversed at any point, and adjustments for irregularities in the seam can be made by means of a handwheel which adjusts the welding wire directly on the seam. Tank seams up to ¾ in. in thickness can be welded at speeds as high as 25 per minute.

— 181 —

Spot Welder, Air Operated, "Hi-Speed"

Gibb Welding Machine Co., Bay City, Mich. [Vol.65,p. 850]

The "Hi-Speed" air operated spot welder is claimed to eliminate the fatigue of the operator and to produce better welds through uniformity in heat, pressure, and time. In welding sheet metal of No. 18 gage and heavier, an increase of speed over hand operation can also be obtained by the use of the welding machine.

On the top of the welder

there is a movable lever, on the end of which is the electrode and wiring connections. On the rear of this arm is attached the piston rod held in knife edge contact by means of a large compression spring.

The air cylinder is mounted on a trunnion so that it swivels with movement of the upper arm. This air cylinder is 3½ in. in diam., and the pinion has a 3½ in. stroke. Since the leverage on the upper arm is approximately two to one, a stroke of 1¾ in. is obtained at the electrode. By means of a regulating valve pressure on the electrodes can be varied from 10 to 100 lb. Further adjustment of the welding pressure is also obtained through a compression spring.

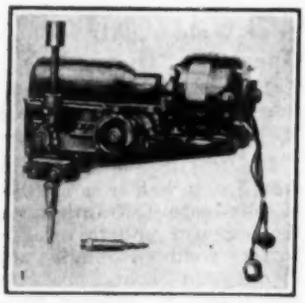
The machine is built in varying throat depts up to 24 in. on the standard machine. The capacity of the unit is for two thicknesses of No. 7 gage sheet.

— 182 —

Welder, Arc, Automatic

General Electric Co., Schenectady, N. Y. [Vol. 65,p.929]

The automatic arc welder is to be sold separately or as a part of a complete welding equipment, including the necessary clamps and framework for holding the work.



The arc is started automatically by touching the electrode to the work and then withdrawing it. A constant arc length is maintained since the electrode wire is fed to the weld at a pretetermined rate.

The welding head consists of a pair of feed rollers geared to a constant-speed motor through a magnetic clutch. The distance and pressure between these rollers are readily adjustable. From the feed rollers the welding wire is fed through a nozzle to the arc.

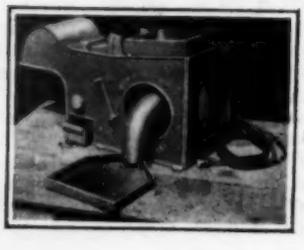
The speed of wire feed may be adjusted to suit the size of the wire and the welding current used. Three gear speed changes can be made by moving the gear shift pin which extends from the rear of the gear housing. An additional finer adjustment can be made by means of a rheostat in the field circuit of the motor.

— 183 —

Separator, Chip

McKenzie Engineering Co., New Rochelle, N. Y. [Vol. 64,p.36]

This bench machine will separate chips from parts up to ⅜ in. in diam. and 1 in. in length, of any metal including light aluminum, in fiber or wood. The finished parts drop into a pan provided for them, while the chips are blown through a hood by means of air furnished by a blower. Parts that are very small and light are separated from the chips by means of an exhaust attachment shown in front of the machine. Chips are sucked up through the exhauster and discharged through the hood, while the finished part drops through a hole in the bench to a box below.



A lever is provided on the separators to regulate the air blast for both blowing and exhausting. The blower is coupled direct to a ¼-hp. motor. The machine is 28 in. long, 14 in. wide, and 16 in. high. It weighs 156 pounds.

— 184 —

Flanging Machine, Adjustable, "Sievert" No. 4

Morey, Jones & Lovell, 810 West Sixth St., Los Angeles, Cal. [Vol.65,p.38]

The "Sievert" No. 4 adjustable flanging machine is designed for flanging work on such products as tank or condenser heads, trays and pans. It will cold handle circular and oval work as well as straight flanging on sheets up to and including 10 gage.

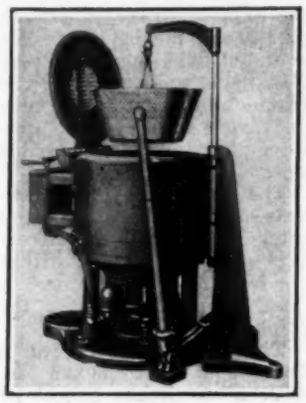
As the handle is drawn down a shoe holds the work on the table and a roller is moved by levers down the side edge of the table, thus bending the edge of the sheet. This holding shoe can be adjusted by means of a setscrew to secure the desired pressure, which is applied by a cam. The handle is counterbalanced by means of a heavy spring.

— 185 —

Dryer, Electrically Heated, "Curtis"

Leon J. Barrett Co., Worcester, Mass. [Vol.65,p. 223]

This machine has been designed for the purpose of drying small parts that have to be washed in soda or potash solutions to clean them for plating. The machine consists of a stationary shell, a motor driven revolving unit within the shell, and an electric heating unit permanently



mounted in a grid, which is part of the cover. The machine is made in two sizes, rated by the holding capacity of the work-container, in 1 and 2 bushels, respectively.

The revolving unit is maintained in an upright position by four heavy coil springs which absorb the shock of an unbalanced load and permit the load to revolve upon its own center of gravity when it is up to speed. Centrifugal action of the container sucks the air into the machine through opening in the heating grid. The machine may be accelerated to normal speed of 1,145 r.p.m. in 10 sec., and stopped in 12 sec. The machine cannot be started while the cover is in a raised position.

A lever operated crane provides a convenient means for lifting the loaded work-container. Motors are furnished for use with 220, 440 and 550 volt, 60-cycle alternating current.

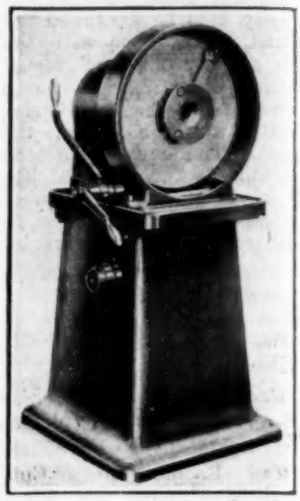
— 186 —

Babbitting Machine, Centrifugal

Manufacturers Consulting Engineers, 487 South Salinas St., Syracuse, N. Y. [Vol. 65,p.304]

The centrifugal babbitting machine illustrated is particularly designed for babbitting automotive connecting rod bearings. A 1-hp. ball bearing motor drives the machine by means of a belt.

The spindle is mounted



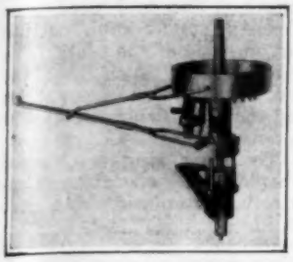
upon ball bearings, and on the front end of the spindle is placed an aluminum face plate, which carries the work holding fixture. The fixture consists of two steel plates; one is fastened directly to the face plate and the other is mounted on three spring plungers. Work is clamped between the two plates by means of the spring pressure. The piece is automatically centered. The piece to be babbitted is first cleaned and tinned, and then placed in the fixture before it can cool. The face plate is rotated, and a measured quantity of babbitt metal is poured through the center hole in the outer plate of the fixture. Centrifugal force throws the metal against the inner wall of the bearing where it solidifies. A production of 75 pieces per hr. is claimed on a connecting rod having a 2¼ in. bore, and 1⅞ in. long. The capacity of the machine is for a 12½-in. connecting rod.

— 187 —

Screw Driving Machine, Automatic

Metal Saw & Machine Co., Inc., 40 Napier St., Springfield, Mass. [Vol.65, p.344]

This automatic screw driving machine is equipped with a standard taper shank so that it can be readily inserted in a drilling machine spindle. It is made in twelve sizes to accommodate screws ranging from ¼ to 2¼ in. in length. The screws are thrown into the hopper in half gross lots. The operator brings down the



feed lever, and as one screw is driven into the work another automatically takes its place.

When the resistance offered by the tightening of the screw reaches a pre-determined amount the clutch is thrown out of gear and the screw driving spindle remains stationary until it is withdrawn from the screw head.

The smallest size machine is model No. 2. It handles No. 2 screws, ranging from ¼ to ½ in. in length. It is provided with a No. 1 Morse taper. The largest machine is No. 14-L and handles No. 14 screws ranging in Length from 1½ to 2¼ in. It is provided with a No. 3 Morse taper. Other sizes range between.

— 188 —

Lathe, Speed, Motor-Driven

Cincinnati Electrical Tool Co., Cincinnati, Ohio. [Vol. 65,p.570]

The motor-driven speed lathe is designed for boring, reaming, countersinking, filing, polishing and lapping

small parts. It is particularly adapted for work on automotive parts.

The standard speed of the machine is 900 r.p.m., but it can be furnished with a motor giving speeds ranging from 90 to 3,400 r.p.m., according to the requirements of the purchaser.

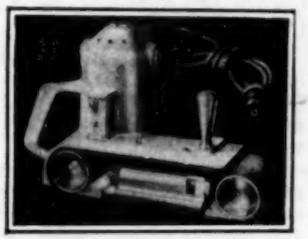
The motor is rated at ¼ hp. and can be furnished for operation on either a.c. or d.c. circuits. The armature and all-gear shafts are mounted upon radial ball bearings. A ball thrust bearing is also provided. A table having micrometer screw adjustment can be furnished if desired. The machine can also be fitted with a multiple spindle head. The machine is regularly equipped with a No. 2 Morse taper socket.

— 189 —

Sander, Hand "Take-About"

Porter-Cable Machine Co., Syracuse, N. Y. [Vol.65,p. 732]

The "Take-About" hand sander is designed to be used in place of hand sanding or polishing on wood and metal surfaces. It is shaped like a hand plane, and its method of operation is somewhat similar. Concave or convex



surfaces as well as flat surfaces can be finished.

A flat hardwood block is regularly furnished with the machine, but it may be changed quickly for blocks of other shapes to suit the requirements of the operator. For sanding interior curves of diameters larger than the diameter of the front pulley the sander may be tilted or lifted into the proper position.

The entire machine with the exception of a few bronze and steel fittings is made of aluminum. It weighs about 12 lb., and can be lifted about without tiring the worker. It is equipped with a ¼-hp. universal motor.

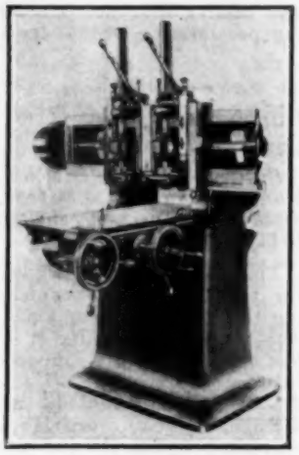
— 190 —

Profiler No. 12, Improved

Pratt & Whitney Co., Division Niles-Bement-Pond Co., Hartford, Conn. [Vol.65,p. 887]

This profiler has been improved so as to increase the range of the machine and to adapt it to a number of profiling jobs that are of a light nature but require an extra amount of work surface. The table has been made longer and wider so as to carry larger work.

The two handwheels, by



means of which the table traverse and spindle-head traverse are controlled, have been brought around to the right side of the machine within convenient reach of the operator. The traversing mechanism for the spindle head has also been changed, and consists of a handwheel geared to a shaft running through to the back of the machine. This shaft operates a gear reduction unit connected to a rack and pinion in the usual manner, except for the increase in length of travel.

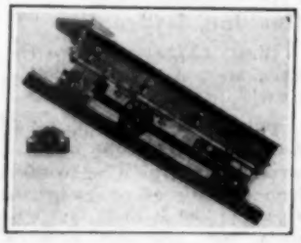
The table is 18¾ in. wide, and 42 in. long, and has a travel of 40 in. The maximum height from the table top to the bottom of the cross slide is 5¼ inches.

— 191 —

Screen, Vibrating, Ball-Bearing

Link-Belt Co., 910 *South Michigan Ave., Chicago, Ill.* [Vol.65,p.931]

This ball bearing vibrating screen is a mechanically operated device and has only one rotating part running in oversize ball bearings. The vibrator consists of a shaft carrying two adjustable counterweights at both ends. Since the bearing box is



bolted rigidly to the screen, the vibration induced by the counterweights is transmitted directly to the screen. The screen frame is supported at four points in spiral-wound springs. The screen cloth is placed upon the deck of the vibrator with its two longitudinal edges bent up. Binders are provided on fine mesh cloth for protection against tearing.

A longitudinal vibration strip assists the screening action and minimizes wear and blinding. A feed hopper attached to the receiving end of the screen box vibrates with it and controls the feed so that the material is uniformly spread over the screening surface.

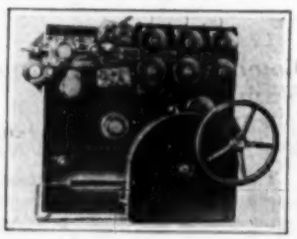
This vibrating screen is made in five standard sizes: 2 x 5 ft., 3 x 5 ft., 4 x 5 ft., 3 x 8 ft. and 4 x 8 ft. and each size can be furnished with either one or two screening surfaces, so that a wide range for materials of varying size is obtained.

— 192 —

Coilers, Spring, Nos. 3½ and 4½

Sleeper & Hartley, Inc., 335 *Chandler St., Worcester, Mass.* [Vol.65,p.969]

Two additional sizes of universal coiling machines, Nos. 3½ and 4½, have been placed on the market. The universal coilers are designed for making all kinds of compression springs of round



wire without tool changes. Extension and close-coiled springs may also be coiled and cut on the machines. The range of the 3½-in. machine is for wire from No. 12 gage to ¼ in., and that of the 4½-in. machine is for wire from 8 gage to ⅜ in.

The No. 3½ coiler will feed and cut springs up to a maximum of 84 in. of wire, and the No. 4½ machine will produce springs containing 130 in. of wire. The maximum output of the smaller machine is 20 springs per min., and that of the larger machine is 30 springs per min. The machine will coil right and left hand springs and produce coned springs.

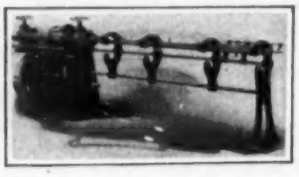
— 193 —

Straightening and Cut-Off Machine, Wire, Automatic

Kane & Roach, Syracuse, N. Y. [Vol.65,p.934]

The automatic wire straightener and cut-off machine will handle any size wire up to and including wire ⅜ in. in diam. A belted model is shown, but the machine can also be arranged for direct motor drive.

The wire is fed through the rotating straightening head by means of a pair of



pinching rolls located between this head and the automatic cut-off shear. First the wire passes into a guide bar provided with grooves. This guide bar is equipped with an adjustable stop gage which automatically trips a cam at a fixed point. By means of this cam action the shears are operated and the material cut to accurate lengths. The automatic cut-off shears are equipped with dies corresponding to various wire diameters, so that the wire is given a clean shear.

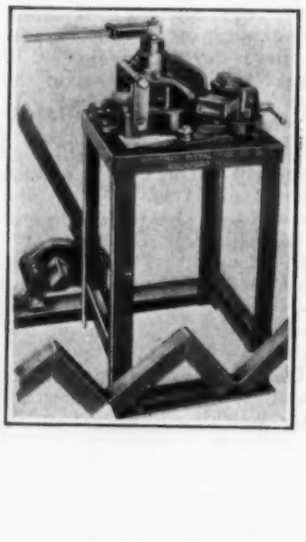
The dumping tables and the automatic cut-off arrangement can be supplied in various lengths.

— 194 —

Combination Angle Iron Machine, No. 455

Whitney Metal Tool Co., Rockford, Ill. [Vol.65,p.1009]

This No. 455 combination angle iron machine, has been improved. The No. 51 bender, which is a unit of this machine, has been redesigned so that it will bend the leg of



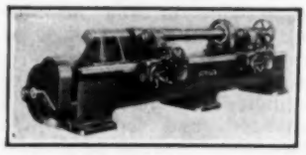
an angle in either direction, inside or outside. This feature is said to be important for ventilating or blow pipe work. The operating handle is now made of a malleable iron casting in order to avoid the possibility of breakage.

— 195 —

Burnishing Lathe, Car-Axle

Putnam Machine Division, Manning, Maxwell & Moore, Fitchburg, Mass. [Vol.65,p. 1045]

This machine was designed for the purpose of burnishing the journals of car axles. The bed of the machine is of box section with the supports cast integral with it. Upon the bed are mounted two tailstocks, two carriages traversed by hand, and the driving head. Both tailstocks are adjustable along the bed and are provided with binders. The tail spindles are



also capable of separate endwise adjustment.

The carriages have V-ways, or shears, at front and back, and a flat-way directly under the front burnishing roll. The carriages are gibbed to the bed. Each carriage has two cross-slides actuated by a right- and left-hand screw, which engages bronze nuts on each cross-slide.

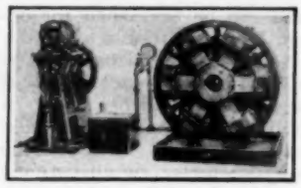
The axes of the burnishing rolls are inclined at a slight angle to the horizontal so that the rolls will creep lengthwise of the journal. The machine is furnished with a crane to handle the work, as desired. Without the crane, its weight is 8,500 lb. and it occupies a floor space of 14 ft. 6 in. by 4 ft., 8 in. Its capacity is such that journals from 2 in. to 8½ in. in diameter can be burnished, and it will take 9 ft., 1 in. length between centers.

— 196 —

Pipe-Compressing Machine, Hydraulic

West Tire Setter Co., Rochester, N. Y. [Vol.65,p. 1088]

This machine was designed for compressing the ends of wrought-iron pipe on to cast-iron end pieces or gudgeons carrying shaft ends, such as rolls for printing presses.



Pipes ranging in diameter from 2½ to 12 in. and from 10 to 12 ft. in length can be handled.

The compressing is done cold, and the pipe is handled in a horizontal position. The machine consists of a series of hydraulic rams set around the interior of a heavy steel ring.

A multiple-cylinder pump is furnished for supplying the necessary hydraulic pressure.

— 197 —

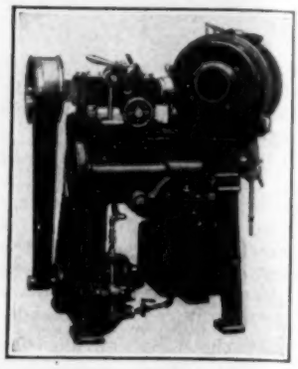
Flywheel Tooth-Rounding Machine

W. C. Lipe, Inc., 208 So. Geddes St., Syracuse, N. Y. [Vol.65,p.1009]

The machine illustrated has been developed for chamfering the teeth of the ring gears used in automobile flywheels.

The ring gear is placed in position on the holding plate attached to the work head of the machine, and is clamped by means of an air chuck. The tool used is a formed hollow mill, cutting on one side of the tooth. The operation is such that the burr is thrown to the outside of the ring, where it can be easily removed.

Once the ring is clamped in place, the operation is entirely automatic, and one



operator can easily take care of three or more machines. Ample flow of oil is directed on the work so that it is possible to chamfer the teeth at a speed of approximately one tooth per second.

The machine is ruggedly built to prevent chatter in cutting. The cutter spindle moves out at each indexing of a tooth, and the feed mechanism is operated by means of a worm drive running in oil. The machine is fully equipped with all the necessary fixtures and tools.

Measuring, Gaging and Testing Equipment

— 198 —

Balancing Machine, "Micro-Poise"

Commerce Pattern Foundry & Machine Co., 211 Grand River Avė., Detroit, Mich. [Vol.65,p.429]

The "Micro-Poise" balancing machine illustrated is particularly designed for balancing flywheels, pulleys, or other rotating parts with comparatively short axes. The standard machine will balance within a limit of ¼ oz.-in. running balance and it can be furnished to a closer degree of accuracy with slight modification. It is claimed that this machine can balance 20 to 25 automobile flywheels per hour.

The machine registers the angular location of the unbalance and is provided with a series of weights which show directly the amount of

metal to be removed in order to correct the balance. A motor driven drill spindle is furnished.

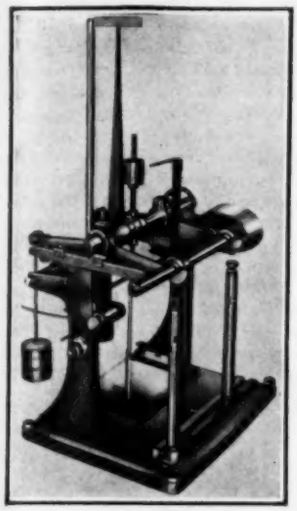
— 199 —

Balancing Machine, Automatic Weighing

Tinius Olsen Testing Machine Co., 500 North Twelfth St., Philadelphia, Pa. [Vol. 65,p.851]

The automatic weighing balancing scale is for use in the static balancing of single turbine wheels, disk wheels and other parts where dynamic unbalance is not present. The balancing spindle is motor driven.

The part to be balanced is mounted on the end of the balancing spindle. By means



of a motor drive this spindle revolves four times a minute, and after two revolutions the operator can determine all data as to the amount and the angle of unbalance. The piece is first counterbalanced by means of the scales so that the pointer is at zero. The piece is then set in rotation and the sweep of the pointer will read the ounce-inches of unbalance directly. The location of the point of unbalance is indicated when the pointer reaches a maximum of deflection.

— 200 —

Gage, Connecting-Rod

Continental Machine Co., 1301 Washington Ave., South, Minneapolis, Minn. [Vol.65,p.266]

This gage is designed for testing and aligning connecting rods and pistons. The machine is especially built for garage use and is designed to fasten to any bench. The rod stands vertically on the mandrel for the bend test, and any error can be sighted between the test plate and the wrist pin.

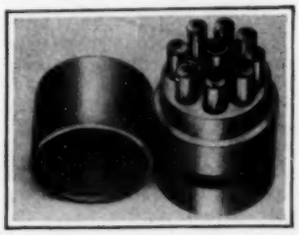
The universal bender that is furnished with the machine is claimed to straighten any rod by simply tightening a screw. A full set of ground arbors is supplied. The method of setting the rod on an arbor is stated to be the only positive manner of securing accuracy in the test. All working surfaces of the machine are ground and accuracy is claimed to a ten-thousandth of an inch.

— 201 —

Gage, Plug, Set, "Handy"

Van Keuren Co., 12 Copeland St., Watertown (Boston), Mass. [Vol.65,p.227]

The "Handy" set of interchangeable limit plug gages comprises a hollow handle with spring grip at each end, into which any two of the seven ground and lapped plugs may be placed. Of the seven plugs which go to make up the set, one is exact nominal size and three are



respectively 0.0005, 0.001 and 0.002 in. over size, while the remaining three are under size by the same amounts. Each plug is plainly marked with its nominal size and the amount of plus or minus deviation. All of the plugs are double-ended with both ends alike.

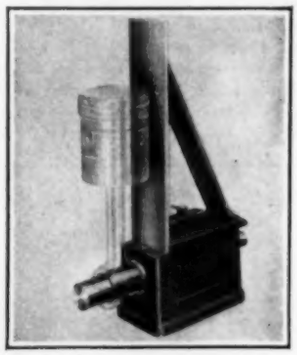
To make up a go-and-no-go gage of 0.001 in. plus or minus tolerance, for example, the plus 0.001 in. plug is placed in one end of the handle and the minus 0.001 in. plug in the other end. There are twenty-one combinations available in each set. These sets are now made in standard 16th-in. sizes up to ½ inch.

— 202 —

Fixture, Piston-Aligning, "Squarod"

Geo. H. Blettner Co., 1841 W. Jackson Blvd., Chicago, Ill. [Vol.65,p.571]

The "Squarod" piston-aligning fixture has been designed to facilitate the alignment and straightening of piston and connecting rods. It has a movable square resting on a rugged base that grips arbors of various diameters to hold the different connecting rod assemblies. The square can be slid out of the way or brought into contact with the work for guidance or proofing purposes while the rods are held and



being corrected for alignment.

The fastening lugs are cast inside the base to prevent dirt from catching in the corners. The fixture is made from heat-treated castings, machined and ground. The bench space required is 5 x 8 in. The height is 20 in. The weight of the device is about 70 pounds.

— 203 —

Gages, D.L.

Pratt & Whitney Co., Division Niles-Bement-Pond Co., Hartford, Conn. [Vol.65,p. 569]

This company has placed on the market a line of gages known as the D.L. Process gages. The gages are made from a special alloy and when given the proper heat-treatment and lapping finish are said to have unusual wear resisting properties.

— 204 —

Micrometer, 0.0005-Inch-Graduated

J. T. Slocomb Co., Providence, R. I. [Vol.65,p.734]

The thimbles of Slocomb micrometers will now be provided with 50 instead of 25 graduation marks on the beveled edge, so that a line-to-line reading may be made to 0.0005 in. instead of to a full thousandth as formerly.

The advantages claimed for the new marking are that

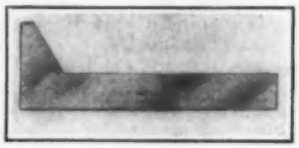
the matching lines are always directly before the operator's eye as he holds the instrument in a natural position, and that he is enabled by the closer spacing to judge a quarter-thousandth more accurately.

— 205 —

Gage, Drill-Grinding

J. M. Waterston, 427 Woodward Ave., Detroit, Mich. [Vol.65,p.852]

The drill-grinding gage is for use in checking the grinding of drills up to 1½ in. in diam. The gage is graduated



in sixteenths with larger divisions at the eighths. The device is made of polished steel. Its length is 4½ in., and its weight 2 ounces.

— 206 —

Gear Material, "Fibroc"

Fibroc Insulation Co., Valparaiso, Ind. [Vol.65,p.228]

A self-lubricating Bakelite gear material, known as "Fibroc GR," is being marketed by this company. The material contains graphite as a constituent, together with Bakelite, so that the teeth of gears made from this material are self-lubricated. An increase of gear life of 35 per cent is claimed for this material. "Fibroc" can be cut rapidly, and is silent in operation.

— 207 —

Steel, "Jalcase"

Jones & Laughlin Steel Corporation, American Steel & Iron Works, Pittsburgh, Pa. [Vol.65,p.510]

"Jalcase" is an open-hearth steel especially adapted for casehardening and for forging where machinability is

important. It can be furnished in the form of either hot-rolled or cold-rolled bars. The following properties are claimed for this metal: It has free-cutting qualities equivalent to Bessemer screw stock. It is superior to the carbon grades of case-carburizing steels and it approaches the alloy grades. It develops a hard, wear-resisting, normal case, free from soft spots, and has a tough ductile core.

It is recommended for case-carburized parts that are subjected to severe abrasive wear, high stresses and repeated shocks.

— 208 —

Dividing Head, Optical, "Zeiss"

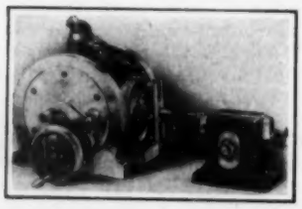
George Scherr Co., 142 *Liberty St., New York.* [Vol.65,p.36]

The above company is marketing in this country, the optical dividing head recently developed by Carl Zeiss.

This dividing head obtains the division of the circle from a glass dial mounted directly on the spindle carrying the work. The precision of the setting depends solely on the scale of the dial which is used through a microscope sight with a magnification of 60 times.

The dial is graduated into 360 degrees and the lines of the scale appear to be 1¾ inches apart. A second vernier scale of 60 minutes reading is projected into the field of observation, and it is claimed that fractions as close as 20 seconds can be estimated in the readings.

The dividing head is designed for rugged and con-



tinuous service. An additional dial plate is mounted on the spindle nose for coarse adjustment on ordinary work. The setting is accomplished by means of a handwheel and the worm can be readily swung out of mesh. The head can be swung from 5 deg. below its horizontal position through an arc of 115 deg. When the spindle is locked, the worm cannot be rotated as the rachet device is automatically brought into action. The spindle is bored to No. 4 Morse taper.

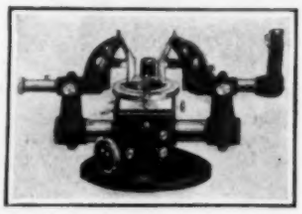
— 209 —

Attachment, "Optimeter," Horizontal, Inside-Measuring, "Zeiss"

George Scherr Co., 142 *Liberty St., New York, N. Y.* [Vol.65,p.264]

The inside measuring attachment for the Carl Zeiss horizontal "Optimeter" is intended to facilitate the work of measuring bores, both absolute and relative. The left-hand bracket of the attachment is clamped into the tailstock of the optimeter while the right-hand bracket is attached to the optical tube.

Since the "Optimeter" measures by comparison, the nominal diameter must be previously set by means of a master gage. The ring or snap gage may be placed on the table which is raised until the measuring points are



within the bore. The deviation of the size of the gage from the nominal size may then be observed in the Optimeter tube. It is necessary, of course, to move the ring gage until the maximum diameter has been located. This shifting is accomplished by means of the compound table motion, the lower slide floats in balls in the direction of the measuring pressure while the upper slide is traveled by a rack and pinion.

It is claimed that a careful operator will work within an accuracy of 0.001 mm. or 0.00004 in. The maximum height of ring gage accommodated is 1¼ in. while the maximum diameter accommodated is 3½ in. The minimum diameter with heavy arms is 1$\frac{1}{16}$ in. while with light arms a diameter of $\frac{3}{4}$ in. can be measured.

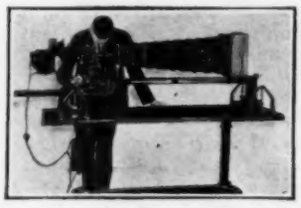
— 210 —

Metallographic Equipment, Model GB-ILSAA

Bausch & Lomb Optical Co., Rochester, N. Y. [Vol. 65,p.507]

The improved metallographic equipment, model GB-ILSAA, illustrated, is designed particularly for the use of metallurgists and engineers and it has been built in conformity with the requirements of the American Society for Steel Treating and of the American Society for Testing Materials.

The complete metalloscope consists of an inverted microscope and illuminating system mounted upon a permanently aligned unit, a camera and camera support, a shock absorbing system and a stand



for supporting the unit. The optical parts of the microscope and illuminating system are permanently mounted in their proper relative positions. The improved stage, which is above the microscope tube, carries the object with its flat surface downward. The focusing is accomplished by means of rack and pinion adjustments acting directly upon the stage. The objective is not moved.

The vertical illuminator is fitted with a sliding plate by means of which it may be removed from the microscope if desired. The opening in the side of the illuminator is fitted with a short tube in which is mounted a small condensing lens, a sliding diaphragm with four apertures, and two glass filters for producing approximately monochromatic light. The illuminating system is rigidly supported by a stand that is a unit with the stand of the inverted microscope. The condensing lens is fixed in place for all objectives.

The camera consists of a tapering bellows of 40-in. extension with front and rear supports and a center frame to prevent sagging. The camera back is reversible and is provided with a hinged door and a plate holder for 8 x 10-in. plates. The front support is fitted with an exposure shutter and light-tight connector for the microscope.

The improved camera back consists of a frame interposed between the rear bellows frame and the camera back proper, in which there is mounted a telescopic magnifier with a right angle prism which faces toward the eyepiece of the microscope.

— 211 —

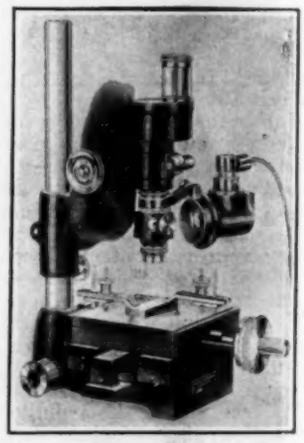
Microscope, Toolmakers'

Bausch & Lomb Optical Co., Rochester, N. Y. [Vol. 65,p.652]

This toolmakers' microscope is rugged and sturdy in design and is adapted to the needs of the workshop as well as the mechanical laboratory.

The principle of operation is as follows: The operator places the part to be examined on the cross-slide stage and clamps it in position. He then focuses the microscope on the part, the image of which appears right side up. One side or point of the object is located by means of a cross line and by means of two micrometer screws the other edge or extremity can be brought under the cross-line. Readings of the micrometer screws give the dimension measured. The base of the instrument carries a compound cross-slide actuated by two measuring screws.

Depending upon the objective used, the magnification is either 32 or 88 times. The eyepiece regularly supplied gives a magnification of 7½



times. Other objectives and eyepieces may be used to obtain magnifications ranging from 20 to 200 times or greater.

The cross-slide stage of the microscope has a range of 1 in. in either direction in the horizontal plane, the two movements being at right angles to one another. A direct reading to an accuracy of 0.0001 in. is obtained by means of a graduated drum attached to the micrometer head.

Other attachments include a lead-measuring device and a protractor eyepiece for measuring helix angles of threads.

— 212 —

Hardness Tester, Special "Last Word," Nos. 1 and 2

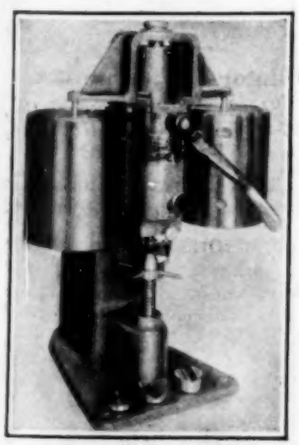
Tinius Olsen Testing Machine Co., 500 North 12th St., Philadelphia, Pa. [Vol. 65,p.265]

The No. 1 special "Last Word" hardness tester was designed primarily for use in testing soft materials and soft sheet metal. The No. 2 tester is for both hard and soft materials.

In the No. 1 machine, instead of applying a 500-kg.

load on a 10-mm. ball, a dead weight load of 12.61 kg. is applied to a $\frac{1}{16}$-in. ball. An indicator is used to measure the depth of impression instead of the width as in ordinary Brinell tests.

The operation of the No. 2 hardness tester is somewhat similar to that of the No. 1 apparatus. As before, the depth of impression is read,



and by means of tables the corresponding Brinell hardness number can be obtained. The weights are suspended from two sides of the crossheads and are removable. Hence the machine may be used for applying a low load on soft sheet metal or a high load for testing steel or harder sheet metal. A diamond can be supplied in the shape of a $\frac{1}{16}$-in. ball, if desired, in place of the standard steel ball.

—213 —

Brinell Proving Ring

Tinius Olsen Testing Machine Co., 500 North 12th St., Philadelphia, Pa. [Vol. 65,p.305]

The Brinell proving ring illustrated is primarily for use in verifying Brinell hardness testers, but with slight modifications it may also be used for verifying heavier capacity testing machines, as desired, up to the capacity of the ring.

The ring is provided with an electrically operated vibrating reed. It is placed in the testing machine and the

reed is started in vibration. The standard Brinell test load is then placed upon the ring and its deflection is measured by varying the position of the knife edge until it interferes with the motion of the reed. By varying the size of the reed other loads than the Brinell load can be verified.

— 214 —

Testing Machine, Impact, 30 Meter-Kilogram Capacity

Tinius Olsen Testing Machine Co., 500 North 12th St., Philadelphia, Pa. [Vol. 65,p.431]

The impact testing machine illustrated has a capacity of 30 meter-kilograms and is intended for making Charpy tests, wherein the steel specimen is in the form of a beam and is injected through a hammer blow. The hammer is in the form of a pendulum and is raised by hand and released by a small latch. The work required to break the specimen over the support is indicated directly on a dial.

The machine can also be

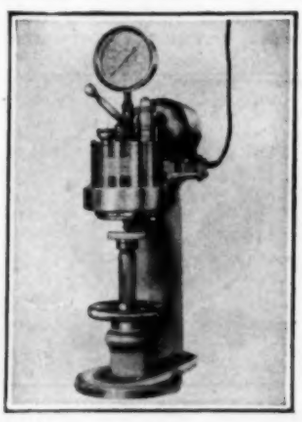
arranged to make a small impact tension test, in which case the specimen is placed at the back end of the raised pendulum weight.

— 215 —

Testing Machine, Power-Driven, Brinell

Pittsburgh Instrument & Machine Co., Pittsburgh, Pa. [Vol.65,p.384]

The power driven Brinell testing machine illustrated has been designed for the rapid inspection of large quantities of material. Controlling weights have been eliminated, and instead the load is applied by means of a hydraulic system controlled by a valve. The pump for supplying the hydraulic pressure is of rotary type and glycerin is used as the fluid medium. It is controlled by



means of a pressure valve in the right side of the cylinder.

The machine is regularly equipped with a ½-hp. electric motor either a.c. or d.c. Belt drive can also be furnished. The speed of the pump in either case is about 300 revolutions per minute.

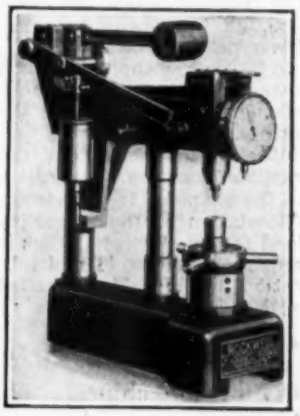
The test piece is placed on the screw table and is brought into contact with a 10-mm. steel ball, upon which a pressure of 3,000 kg. has been placed. The testing machine is furnished in three sizes and will take test pieces up to 6½, 13 and 20 in. between the steel ball and the screw table.

— 216 —

Hardness Tester, Model G, "Rockwell"

Wilson-Maeulen Co., 383 Concord Ave., New York, N. Y. [Vol.65,p.345]

The improved Model G "Rockwell" hardness tester has been made smaller and sturdier in construction. The castings are held in position rigidly by two heavy steel columns so as to prevent



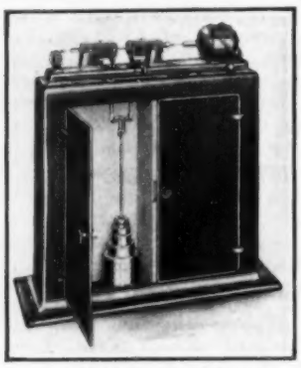
warpage. The elevating screw operates in a hardened tool steel bushing and adjustment is provided to bring this bushing exactly central with the penetrating point. The nose of the machine is more highly tapered in order to give greater visability at the point of test and to permit the nose to get down into recesses.

— 217 —

Testing Machine, Fatigue

The Thompson Grinder Co., Springfield, Ohio. [Vol. 65,p.727]

The fatigue testing machine is used for determining the resistance of metals to repeated stresses. The machine consists of two light aluminum housings, each of which supports a rotating journal. The ends of the test specimen are attached within a tapered hole in the journals. The housings are supported on fulcrum pins and serve as a mounting for the journal bearings, and also as a means of applying the load. The load is transmitted to each housing through a hanger yoke.



To the bottom of the yokes are attached hanger arms, which are joined at their lower ends by an equalizing bar, from the center of which the load is hung. The load is built up in units of ten pounds and fractions, and the readings can be seen through the opening in the lower part of the machine.

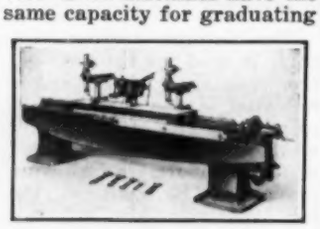
The load is applied in such a manner that the bending moment is uniform over the entire specimen, and the test automatically seeks out the weakest location, regardless of the shape of the specimen. Calculation of the necessary load for any desired stress is reduced to a single multiplication by a table supplied with the machine.

— 218 —

Dividing Machines, Linear, Nos. 0015 and 0016

Société Genevois d'Instruments de Physiques, Geneva, Switzerland. [Vol.65,p.930]

The precision linear dividing machines, Nos. 0015 and 0016, incorporate considerable changes over former models. This equipment is being marketed in this country by the R. Y. Ferner Co., Investment Bldg., Washington, D. C. The No. 0015 machine is entirely hand-operated, while the No. 0016 machine is fully automatic, being driven by a ¼-hp. motor. Both machines have the same capacity for graduating



linear scales up to 20 in. in length, and can be used to make rulings on metal, wood, celluloid, or glass.

The lead screw thread has a profile angle of 30 deg. so as to give a large bearing surface. By the use of a compensating templet the error of the screw is reduced to less than 0.0001 in. The total periodic errors of the screw are less than 0.00003 inches.

The pattern of the bed has been entirely changed and the micrometer head placed at the right-hand end instead of the left, in order to make the machine more convenient for hand operation. A new type of tracing tool has been provided, which is simpler to adjust and more substantial in construction. The maximum height of the engraving tool above the table of the machine has been increased from 2 to 3 in., and lighter lines, as well as heavy, may now be ruled, the lines varying in width from 0.002 in. to 0.006 in. With a diamond engraving tool lines as fine as 0.0001 in. in width can be ruled. The maximum length of lines that can be ruled with the machine is 1 inch.

— 219 —

Counters, Revolution, Stop

Viking Tool & Machine Co., 745 Sixty-Fifth St., Brooklyn, N. Y. [Vol.65,p.969]

This revolution stop counter is for use in automatically stopping a machine after a predetermined number of revolutions ranging from 1 to 9,750 have been made. The device is particularly applicable to various types of coil-winding machines where a fixed number of turns are to be wound, for linear measuring machines, power presses, screw

machines, chemical mixing machines, textile and press machinery.

Four styles of counters are made. In the first type the stopping is accomplished by a make-and-break electrical contact that operates a suitable relay. A second type of counter is equipped with a mechanically-operated lever, by means of which clutches can be operated for stopping the machine. A third style operates a bell or other signal, which is merely actuated to warn the operator that the machine has made the required number of revolutions. The fourth style constitutes a plain counter, by means of which the number of revolutions or strokes made by a machine can readily be determined through observation. This last style of counter is limited to 9,900 revolutions, and by means of suitable gearing between the device and the rotating member any reasonable number of revolutions above this can be counted.

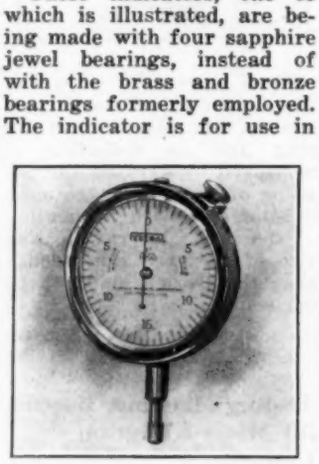
The device consists essentially of a driving worm and a split wormwheel consisting of two independent disks, having 99 and 100 teeth, respectively. The two disks are mounted on a single stud, and for every hundred revolutions of the worm, the rear disk advances one hundredth of a division over the front disk.

— 220 —

Indicator, Dial, Improved

Federal Products Corporation, 15 Elbow St., Providence, R. I. [Vol.65,p.1008]

These indicators, one of which is illustrated, are being made with four sapphire jewel bearings, instead of with the brass and bronze bearings formerly employed. The indicator is for use in



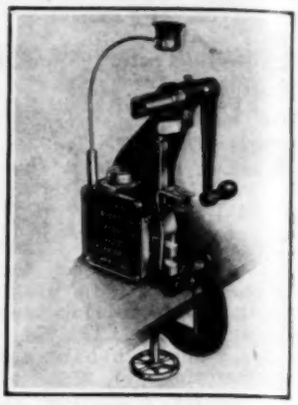
checking tolerances of work while the work is being produced on a machine. Jewel bearings were adopted to prolong the life of the indicator and at the same time preserve its accuracy.

— 221 —

Dynamometer, Die, Wire-Drawing

Robert Miller, 4725 Lancaster Ave., Philadelphia, Pa. [Vol.65,p.968]

The "Duplex" traction dynamometer illustrated is for use in testing diamond wire-drawing dies, and is de-



signed for attaching to a bench.

The outfit consists of a winding drum, operated by means of a crank, a suitable frame for holding the diamond wire-drawing die, and a spring balance equipped with an indicator for registering the tractive force in pounds. The end of the wire is given a turn around the winding drum, and the crank is then turned until the wire is completely drawn through the die during which time the tractive force on the wire is read on the indicator directly in pounds. The wire is then placed in a special bobbin and the crank is then turned slowly until the wire breaks. The indicator reading is noted.

A magnifying glass suspended over the instrument can be used for examination of the wire for surface defects.

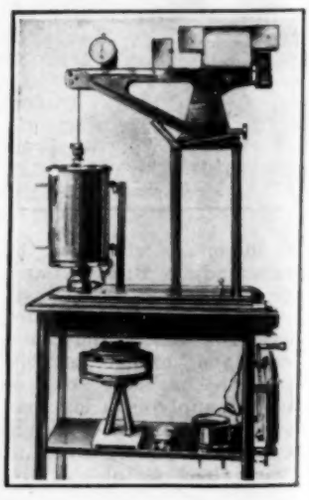
Two ranges of measurement are provided, one being one-tenth the other.

— 222 —

Dilatometer, Type L.A.

Stanley P. Rockwell Co., 66 Trumbull St., Hartford, Conn. [Vol.65,p.508]

This laboratory outfit is intended primarily to be used



in research work in the heat-treatment of steel. It can also be used for the hardening of small dies and tools in the shop.

The outfit consists of a small electric furnace with rheostat control, and a Rockwell Type L.A. Dilatometer to indicate mechanically the volumetric changes that take place in the block of steel under observation. A pyrometer is furnished only upon specification.

The Dilatometer consists primarily of an amplifying lever, to the short end of which is attached a quartz rod that bears directly upon the part in the furnace. The long end of the lever carries a stylus to record graphically upon a moving chart a diagram that shows the magnified movements of the steel. By means of a relay, the instrument is made to ring a bell the instant the heated steel is ready to be quenched.

Material Handling

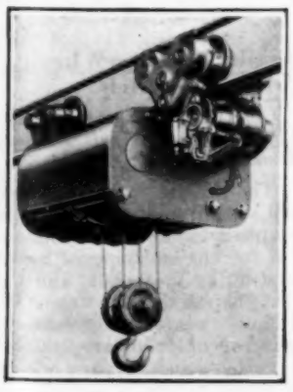
— 223 —

Hoist, Monorail, Electric, "Lo-Hed"

American Engineering Co., Philadelphia, Pa. [Vol.65,p.263]

Six electric monorail hoists, ranging in capacities from 3 to 12 tons, have been added to the line of "Lo-Hed" hoists. Each of the hoists is made in types for bolt suspension. A hand-geared trolley or a motor-driven trolley with cab control can be provided. Open cabs are supplied for indoor use and closed cabs for outdoor service. The hoists can also be furnished with push-button control, remote control, or foundry-type control, as desired.

These hoists, which are designated as "Class J, Lo-Hed" electric hoists, have rated capacities of 3, 5, 6, 8, 10 and 12 tons. The drum and motor are placed on opposite sides of the I-beam track, so that the load block



can be drawn up between them until it almost touches the rail and all available headroom utilized. The trolley wheels are mounted on Hyatt roller bearings and ball thrust bearings are placed between the wheels and the trolley frame. The wheels on both sides of the I-beam are driven through straight spur gears.

The ball-bearing hoisting motor is totally inclosed and it drives the drum through spur gears that run in oil. Hyatt bearings are also provided on this shaft.

—224 —

Hoist, Electric, 1-Ton

Harrington Co., Philadelphia, Pa. [Vol.65,p.431]

The 1-ton electric hoist illustrated is designed for hook suspension either parallel or at right angles to the body, for use with an I-beam trolley. The minimum distance between the suspension hook and the load-carrying hook is 23½ in. Fixed lug

suspension can also be furnished.

The hoist is driven by means of a universal motor, rated at 2½ hp., with any frequency from 0 to 60 cycles, either 110 or 220 volts. It is series wound and has high starting torque. The motor is covered to prevent the entrance of water from above but is ventilated. A brake is incorporated on the shaft for automatically stopping the motor. The armature shaft is mounted on ball bearings.

The hoist drum is driven through two spur gear reductions and a final worm-and-wheel reduction unit. The worm is mounted upon ball bearings, both radial and thrust, and operates submerged in oil. A circulating system is used to lubricate the other gears and bearings. The worm and wheel are self-locking so that the load cannot overhaul the motor through the gears.

The hoist is controlled by means of a drum controller operated by means of two rope pull handles and so shaped as to indicate plainly the direction of the hook movement. Remote push-button control can also be supplied.

— 225 —

Chain Block, Gravity-Lowering

Herbert Morris, Incorporated, Buffalo, N. Y. [Vol. 65,p.471]

The gravity-lowering chain block is designed in five sizes, ranging from ½ to 5 tons in capacity. It is claimed that even the 5-ton block will lower by gravity with only 14 lb. on the hook.

The frame is made of rolled-steel plates and forgings. The hoisting mechanism consists of a worm and

a wormwheel made integral with the load-chain wheel. On one end of the worm shaft is mounted a centrifugal brake that keeps the lowering speed within safe limits when the hoist load is allowed to drop by gravity. An automatic stop actuates a brake when the hook reaches its lowest position. The hand chain wheel is provided with a runaway clutch so that it does not move while the hoist is gravity-lowering. The load may be lowered in the usual way by pulling on the hand chain, in order to provide accurate placement of the load when desired. An automatic brake on the worm shaft sustains the load whenever the hand chain is released.

The ½-ton hoist has a standard clear lift of 8 ft. while the 5-ton hoist has a standard clear lift of 12 ft. The smallest unit weighs 94 lb., while the largest weighs 435 pounds.

— 226 —

Hoist, Electric, Universal, "McCollum"

Louis E. Emerman & Co., 1761 Elston Ave., Chicago, Ill. [Vol.65,p.548]

This hoist is manufactured by the McCollum Hoist & Manufacturing Co. It will operate interchangeably on single-phase, alternating current or on direct current. It

can be plugged into a lamp socket in a 110- or 220-volt line.

The hoist is being supplied in two-load capacities. The 1,000-lb. model has a no-load speed of 22 ft. per min.; with rated load the speed is 12 ft. per min. It is claimed that this type will easily lift 1,500 lb. The 2,000-lb. type has a no-load speed of 11 ft. per min; with full load on the hook, the speed is 6 ft. per min. The minimum headroom required for the hoist is 11 in. The weight, complete with 12 ft. of chain and one hook, is 95 pounds.

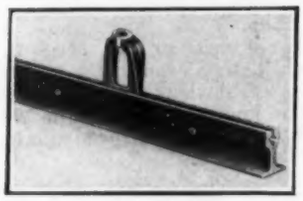
— 227 —

Track, "Monorail"

American Monorail Co., West 67th St. and Pear Ave., Cleveland, O. [Vol.65,p.471]

This improved form of rail was designed for overhead hand-power monorail systems. The "Monorail" consists of two twin steel sections, bolted together back to back to form a single unit.

It is claimed that the sections have been so designed that the rail is capable of bridging wide spans and sustaining rated loads without deflection because of the high vertical web. Its narrow width, however, of two



inches is said to make bending easy to meet any layout requirements. Standard bent sections can be furnished when conditions are specified. The clamping bolts and nuts are of special design and are double-locked when tightened.

The supporting hangers are made of steel forgings. They are assembled in the rail head and the spacing can be suited to meet any suspension requirements. The hangers are adapted for plain strap or adjustable bolt suspension. The monorail has overlapping and connections, and forms a continuous runway without broken joints and without the use of splice clamps. Hanger supports are placed at splicing points so as to prevent deflection of the rails.

— 228 —

Truck, Industrial, Tier-Lift

Wright-Hibbard Industrial Electric Truck Co., Inc., Phelps, N. Y. [Vol.65,p.185]

This tier-lift industrial truck is for use in narrow aisles and congested places. Energy is supplied by means of storage batteries, either six cells of 21-plate Exide batteries, or twelve cells of A-8 Edison batteries. A feature of the machine is the fact that a single electric motor is used for both lifting the platform and propelling the truck. The change of drive is effected by means of a gear-shift lever.

The length of the truck is 87 in., and the overall width

of the unit is 27½ in., with a standard platform of 42 x 18 x 6½ in. A platform 53 x 24 x 9 in. can also be supplied. The last dimension is the height above the ground when the platform is in its lowest position.

This tier-lift truck is made in four heights of lift, 3, 4, 5 and 6 ft. The overall height of the unit is 18 in. more than the specified lift in each case. The rated capacity is 4,000 lb. The lifting speed is 7½ ft. per min. under full load, and 17 ft. per min. without load. The truck is interchangeable with the R-11 and the R-12 elevating platform trucks made by this company.

— 229 —

Cupola Chargers

Baker-Rauling Co., Cleveland, Ohio. [Vol.65,p.388]

This crane-type electric truck for cupola charging operates in conjunction with the Chisholm & Moore one-ton charging bucket, which

incorporates Morgan patented bucket yokes. The truck itself is assembled principally of standard Baker parts. The motors receive power from a 48-volt storage battery contained in a large steel box near the driver's end of the truck. The boom is strengthened with a steel plate on the side toward the fire so as to keep the heat away from the cable as well as the hoist.

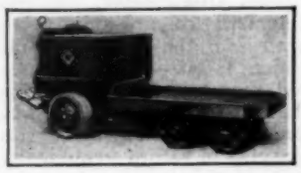
The Morgan charging bucket is circular in shape and has a conical bottom. The bucket is loaded and picked up by means of an eye fastened to the center of the bottom. When the bucket is raised, four dogs on the yoke engage with the angle iron ring around the top of the bucket.

— 230 —

Industrial Truck, 10-Ton, "Super-Lift Tructor"

Elwell-Parker Electric Co., Cleveland, Ohio. [Vol.65,p. 614]

The 10-ton "Super-Lift Tructor" illustrated can pick up this load as well as trans-



port it electrically. The lift mechanism is located beneath the battery. It consists of a special motor direct-connected to a single worm reduction unit operating a screw lift ram, which raises and lowers an all-steel reinforced platform.

The tandem trail axle carries four wheels, each of which is fitted with two differentiating tires to provide steering creep. All four wheels steer simultaneously with the two large drive wheels located beneath the battery. These four wheels carry the bulk of the load, and each is mounted upon two tapered roller bearings.

The lift motor is fitted with an electro-mechanical brake, and the controller is operated by means of a lever which is automatically tripped when the platform reaches the upper and lower limits of its travel. Automatic trip connections are also located beneath the battery.

The main travel controller is of improved design. The reverse drum is interconnected with the lift pedal on which the operator stands.

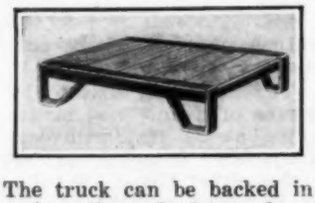
The frame is of heavy construction, but it has been designed to keep the weight down to a minimum. It weighs approximately 6,100 lb. with battery and carries 20,000 lb. at a rate of 300 to 400 ft. per minute.

— 231 —

Lift Truck Platform, Steel Frame

The Lewis-Shepard Co., Watertown Station, Boston, Mass. [Vol.65,p.806]

The steel frame platform is for use with lift trucks.



The truck can be backed in under the platform from either side or either end as the clearance on the underside of the platform to the floor is the same on all sides.

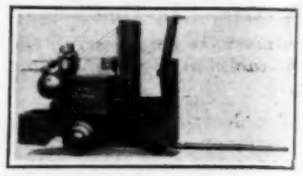
The platform is steel bound all around, so that no end boards are exposed to the bumps of the truck as it is backed in under either end. The steel frame is a unit in itself and does not depend upon clamping to the wood top for its strength. Welding is used throughout to obtain a single solid metal structure.

— 232 —

Truck for Carrying Crates

Baker-Raulang Co., Cleveland, Ohio. [Vol.65,p.971]

This company has adapted its "Hy-Lift" truck for carrying large crates, or similar packages. The carriage is fitted with two forks placed on the usual platform and clamps are provided for securely holding either one or



two packages. This machine was developed to handle crates of uniform size to the bottom of which 3x3 in. cleats were nailed. These cleats raised the crate above the floor sufficiently so that it could be picked up with the forks.

The clamping action is entirely automatic and takes effect as soon as the truck commences to lift. One crate may be picked up and placed on top of another and then both of them carried on one load. In this case the lower clamp drops back out of the way and the upper clamp comes into operation.

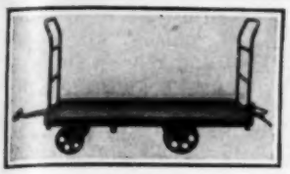
— 233 —

Trailer, Caster-Wheel, Automatic-Hitch

Clark Tructractor Co., 1102 Days Ave., Buchanan, Mich. [Vol.65,p.617]

The caster wheel trailer with automatic hitch is claimed to be most economical for the carrying of heavy and bulky materials, and the design permits the trailer to follow perfectly, when a number of them are coupled together, and to turn within a small radius.

The platform size is 6x3 ft. and it is 13½ in. from the ground. It is made of cross boards of hardwood held in place by hardened bevel sills and reinforced by steel plates and a T-iron frame. Strengthening girders run lengthwise



under the platform flooring.

The rear wheels are 12 in. in diam. with a 3½-in. face. The front wheels are of the caster type 10-in. in diam. with a 3-in. face. All wheels are equipped with Hyatt roller bearings. The wheelbase of the truck is 38 in., and the wheel gage is 23 inches.

The automatic hitch is designed to insure rapid coupling and uncoupling of long strings of trailers and to permit trailer trains to turn sharp turns without unnecessary drag.

Racks for holding materials on the platform may be used on either sides or ends. Eight steel pockets are also provided. The carrying capacity is 4,000 pounds.

— 234 —

Trailer, Fifth-Wheel

Clark Tructractor Co., Buchanan, Mich. [Vol.65,p.850]

The tongue of the rubber-tired fifth-wheel trailer is used for both steering and coupling either one trailer to the other or direct to the

tractor. It has a capacity of 3 tons and is designed for use with bulky loads.

The platform is built of hardwood, 1¼ in. thick, set flush with frame. The corners are rounded and the ends are bound with 4-in. steel bands. Dimensions of the platform are 6 ft., 3 in. in length by 3 ft. in width. The height of platform is 20 in. Full Hyatt bearing equipment is used on all four wheels. Hard rubber truck tires are pressed on all wheels, but steel wheels can be furnished if desired.

The complete trailer weighs 685 pounds.

— 235 —

Hand Truck, Steel

American Pulley Co., Philadelphia, Pa. [Vol.65,p.306]

The steel hand truck is made of pressed and forged steel parts and is said to be strong and serviceable. It is claimed that special study

was devoted to the balance of the unit and the true running of the two wheels. Parts injured in an accident can readily be replaced. The truck is light and hence can be handled easily. It is made in several models and in a range of sizes.

Woodworking Machinery

— 236 —

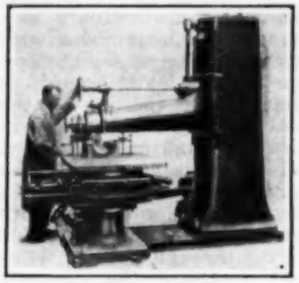
Miller, Wood, Universal, "Semi-Auto"

Wadkin & Co., North Evington, Leicester England. [Vol.65,p.651]

The Watkin "Semi-Auto" universal wood miller of improved design is being marketed in this country by Charles A. Straling Co., 155 E. Kirby Ave., Detroit, Mich. It is particularly adapted for pattern work. All its motions are under hand and power control, and it is fitted with scales and micrometer feeds to facilitate the production of accurate surfaces. It can be quickly changed over from one operation to another.

The main frame is a heavy casting, having accurately machined slide ways to receive the overhanging arm that carries the spindle head. The arm can be raised or lowered either by power or hand feed. It is said that it is absolutely rigid under even the heaviest cut.

The spindle head carried on the overhanging arm



swivels between the vertical and horizontal in either direction. The principal angles are indexed and the head can be located in any intermediate angles. The spindle runs in heavy ball bearings, and three speeds are provided.

By means of a handwheel on the capstan head, the direction of rotation on the spindle may be reversed. The same handwheel controls the starting and stopping of the spindle. A hand lever provided with limit stops is used to control the feed for the cutter spindle. In addition, a micrometer hand feed is fitted to give fine readings.

The work table has two motions at right angles, both of which are operated by screw and handwheel. It can be floated to and fro by hand when the operator is dealing with light work.

— 237 —

Planer and Jointer, Hand, No. 144

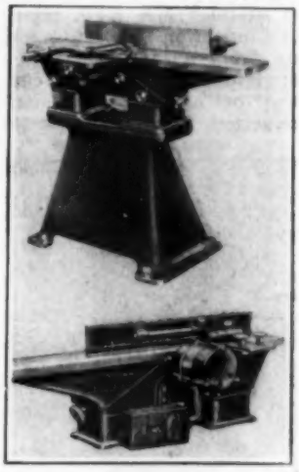
Oliver Machinery Co., Grand Rapids, Mich. [Vol. 65,p.968]

The No. 144 planer and jointer has a rated capacity of 6 in. and is intended for production work. It is built both in a bench type or mounted on a suitable pedestal.

The bed is cast solid with the two columns and the ball bearing housing. It carries on 60-deg. machined dovetail bearings the inclined ways that support the tables. The design of the bed is such that efficient shavings exhaust is provided.

The tables are made of cast iron with removable steel lips at the cutting throat. Each table is 6½ in. wide, the front one being 24½ in. in length and the rear one 15½ in. Each table is independently adjustable toward and away from the cylinder. The lips are shaped concentric with the cylinder so that the tables can be drawn to the minimum opening of cylinder throat.

The cylinder is the so-called Oliver "Circular-Safety" type made of forged crucible steel and of patented



elliptical design for clearance of shavings and smoothness of cut. The cylinder is mounted on double-row self-aligning ball bearings, lubricated by grease. It is furnished in either two or three knife type as specified and carries special tungsten-chromium high-speed steel knives and adjustable chip-breakers.

The machine is regularly equipped with the "Oliver" aluminum automatic knife guard which is automatic in movement and always covers that part of the knives not actually cutting.

The fence is rigidly mounted and planed true. It can be tilted and locked at any angle from 90 to 45 degrees.

Three distinct types of motor drive can be furnished: Direct motor-on-cylinder shaft drive is furnished only for 2- or 3-phase, 60-cycle, 220-volt alternating current. A direct-coupled motor drive is furnished for 1-, 2- or 3-phase, 60-cycle, 110- or 220-volt alternating current, or direct current.

— 238 —

Saw, Portable, Universal, "Union"

Gallmeyer & Livingston Co., Grand Rapids, Mich. [Vol.65,p.430]

The "Union" portable universal saw, illustrated, is being marketed by the above

company. The table of the machine is mounted upon a cast-iron pedestal.

The motor and all the working parts are built into the upper portion of the machine so that it is a self-contained unit. This unit can be removed from the pedestal and used as a bench type machine, should occasion demand.

Two types of motors can be supplied: A ½-hp. repulsion-induction motor to operate from a lamp socket on single-phase alternating current or a 1-hp. repulsion-induction motor to operate

from a power line. When equipped with this latter motor and an 8-in. saw, the machine will handle stock up to 12 in. in width by 2½ in. thick. In either case the motor is belted to the saw arbor, which rotates on ball bearings.

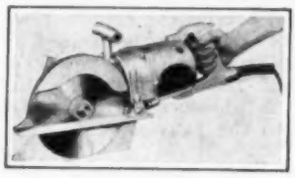
The table is fitted with a removable throat plate to permit the use of dado heads, cope heads, grooving saws and the like. The saw can be raised and lowered from a position flush with the table, to one 2½ in. above the table. The table can be tilted to any angle up to 45 deg. Both cross cut and ripping gages are provided, the cross cut gage to be set at any angle and clamped into position. The ripping gage is machined on both sides and can be used on either side of the saw. It is provided with a T-head.

— 239 —

Hand Saw, Electric

Michel Electric Hand Saw Co., 3814 *Ravenswood Ave., Chicago, Ill.* [Vol.65,p.75]

The electrically driven hand saw illustrated is being placed on the market under the trade name of "Skilsaw." The saw is driven by a General Electric universal motor. Cord and a plug are provided for connecting the unit to an ordinary lighting circuit.



The handle of the machine resembles an ordinary saw handle and is provided with a trigger control for the motor circuit. A guard is placed over the top of the saw and a guide is placed in line with and to the rear of it to insure a continuous straight cut. An adjustable depth gage limits the depth of cut, so that it is possible to cut through flooring without touching the concrete beneath or nicking the sleepers.

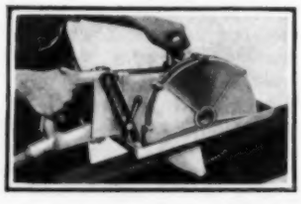
The unit is readily portable and is intended for maintenance and repair work. It weighs 19 pounds.

— 240 —

Hand Saw, Electric, Portable, "Alta"

Wappat Gear Works, Meade St. at Braddock Ave., Pittsburgh, Pa. [Vol.65,p.886]

The "Alta" portable electric hand saw is for use in sawing lumber on construction jobs and in industrial plants. It is equipped with a powerful universal motor and cross-cuts and rips boards up to and including 3 in. in thickness. Special saw blades can be furnished for cutting wood, fibre, bakelite,



hard rubber, stone, steel and many other materials.

Five saw blades are furnished unless otherwise specified: Two 8-in. and one 9-in. combination saw for cross-cutting and occasional ripping; one 8-in. and one 9-in. rip saw. The motor is rated at ¾ hp. and is mounted upon Timken roller bearings, as is the worm gear drive to the saw spindle. Regular equipment includes 15 ft. of heavy-duty cable and a plug.

A particular feature of this device is a telescoping guard that completely incloses the blade and automatically opens only when the saw is pushed into the material. A wide carrying shoe supports the weight of the tool and prevents tipping, so that the chief effort of the operator is in guiding the saw. The shoe is adjustable for any depth of cut and it insures square cuts.

A blast of air from the motor ventilating fan is directed to the front of the saw to blow the sawdust away. The total weight of the outfit is 31 pounds.

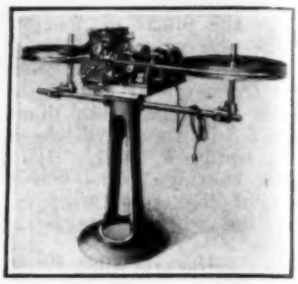
— 241 —

Filing, Setting, and Jointing Machine, Bandsaw

Wardwell Manufacturing Co., 110 *Hamilton Ave., Cleveland, Ohio.* [Vol.65,p.262]

The bandsaw filing, setting and jointing machine illustrated is built in two sizes, the model K being intended for use with woodworking saws from ⅛ to 2 in. wide and having 2 to 15 teeth per inch, and the model K2 for spring tempered metal cutting bandsaws ⅛ to 2 in. wide with any number of teeth per inch up to 26. The machine is equipped with a double-pull positive feed, and is fully automatic.

Two adjustable cams working in unison alternately tighten and release the saw. Another cam raises the file slide frame at a slight angle from the vertical so as to give an oblique movement to



the file as in hand filing. The setting mechanism is governed and timed by an eccentric roller geared to the main drive shaft. The setting mechanism can be adjusted so that the proper clearance is obtained behind the cutting edge of the teeth. This operation is performed at the rate of 70 teeth per minute.

The machine weighs 78 lb. equipped for belt drive and without the pedestal. It may also be furnished with a direct connected motor.

Small Tools

— 242 —

Grinding Wheels, Cut-Off, "Aloxite-Redmanol"

Carborundum Co., Niagara Falls, N. Y. [Vol.65,p.188]

"Redmanol" combined with the regular "Aloxite" of the above company is being used to form cut-off grinding wheels.

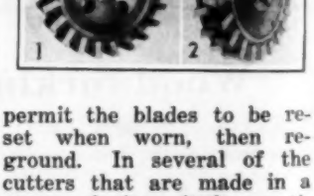
The popular size cut-off wheel is 12 in. in diam., although the wheels can be supplied also in 8 in. or under, 10 in. and 14 in. in diam. The minimum thickness of the 8-in. wheel and smaller is ¼ in., while that of the 14-in. wheel is ⅛ in. The recommended grades are as follows: For Stellite, 50 K grit, 4 bond; for miscellaneous work, 50 K grit, 6 bond; and for high-speed and soft steel, 50 K grit, 8 bond.

— 243 —

Cutters and Tools

O. K. Tool Co., Shelton, Conn. [Vol.65,p.506]

This company has added to its line of cutting tools several improved types. The bodies of the milling cutters and boring tools are made of heat-treated, chrome-nickel steel and the blades are of high-speed steel in each case. The blades are driven tightly in serrated, tapered slots in the bodies. These serrations



permit the blades to be reset when worn, then reground. In several of the cutters that are made in a range of sizes, it is practicable to use the blades of one cutter in the body of a cutter of smaller size when the range of adjustment of the first cutter has been exhausted.

A heavy-duty face mill, intended for use in connection with a shanked driving plate is made in sizes ranging from 8 to 24 in. in diam. One driving plate may serve for several sizes of cutter.

A double-faced slotting cutter with interlocking teeth is also made. The body is made in two parts, fastened together by screws. The parts may be separated and packed apart by placing space washers between to compensate for regrinding.

A form of boring tool, intended to be used in the spindle of a boring mill, milling machine or drill-press, is provided with either a parallel or a tapered shank. This tool is designed for use in connection with a jig and is provided with an adjustable stop-collar and with hardened steel wearing strips to bear in the jig bushing. These strips are set in parallel slots equidistantly disposed about the body of the tool. When this pilot, or bearing portion, has become worn in service the strips may be set out by placing packing material under them. This tool is made to order in any commercial size from 1¼ in. up.

A heavy-duty planer tool is also made. The body of the tool is of heat-treated, chrome-nickel steel and the bits of high-speed steel. The body of the tool measures 3¼x4 in. in section and is 18 in. long. The toolbits have round shanks, by which they are held in the body. Square-nozed bits and right- and left-hand diamond point bits are furnished.

—244—

Blade, Hacksaw, High-Speed Edge, "Marvel"

Armstrong-Blum Manufacturing Co., 347 *North Francisco Ave., Chicago, Ill.* [Vol.65,p.547]

The edge of this hacksaw blade is made from high-speed steel, welded to a tough back or body. The blade is designed to combine

the qualities of the tungsten steel edge with the non-brittle characteristics of the body of the saw blade so as to secure flexibility.

The saw teeth of the edge are designed with an undercut shape of tooth, which it is claimed will cut more rapidly than the ordinary straight or milled type of tooth. The blades are being supplied in 12, 14, 17, 18, 21 and 24 in. lengths.

—245—

Hacksaw Blades "Silver Steel"

E. C. Atkins & Co., Indianapolis, Ind. [Vol.65,p.695]

The "Silver Steel" hand hacksaw blade has similar properties to the silver-steel power blade made by this company. These blades are claimed to cut from 28 to 50 per cent faster than the same size blade of other steels, and to give six times as much service. The blades are made in all of the standard pitches.

—246—

Snip, Circle, Extra-Heavy, No. 05

The Niagara Machine & Tool Works, 637-697 *Northland Ave., Buffalo, N. Y.* [Vol.65,p.851]

The extra heavy, curved lip cutting snip is designed especially for cutting heavy

sheet metal used in the automobile body industry. The features claimed for the "Niagara" snip are a snugly fitting pivot bolt, and keen cutting edges that retain sharpness.

—247—

Files, "Silver Steel"

E. C. Atkins & Co., Indianapolis, Ind. [Vol.65,p.930]

This company is manufacturing files under the trademark "Silver Steel" that has been used in connection with the hack saw manufactured by this company. The line includes all types of standard files for all classes of work.

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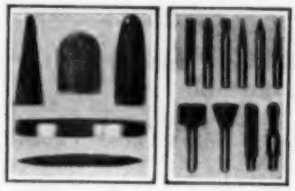
File, Rotary

Rotary File Co., 279 *Euclid Ave., Brooklyn, N. Y.* [Vol.65,p.1048]

Thirty-one standard shapes of high-speed steel files or burrs for use with flexible shaft equipment are available. A few of the shapes are illustrated. They are straight, concave, convex, balled or coned. These files are adaptable in removing stock, reducing angles, cleaning filters, reaching into difficult recesses, corners and grooves.



All blanks are turned from high-speed steel, and the cutting is done by hand with a universal spiral cut, so that the tool works equally well on all metals. Course or fine cuts can be supplied when required. The files are hardened at 2,250 deg. F. by a special process to improve the edges.

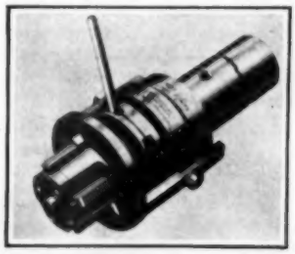
—249—

Taps, Collapsible, Style S, "Namco"

National Acme Co., Cleveland, Ohio. [Vol.65,p.35]

The style S "Namco" collapsible taps are designed to replace an older line manufactured by this company, of which the unlimited depth model was described on page 1097, Vol. 45, of the *American Machinist.*

The improved model has a heavy cup-like front plate closely fitted over the body of the tap to add to the rigidity of the tool and to prevent the



slotted portion of the body in which the chasers are held from springing or opening up under pressure.

The chasers are supported throughout their entire length while the thread is being cut. When the core piece is rotated to the collapsing position the chasers are immediately collapsed. The chasers used are of the hobbed type. Overhang chasers can be used for threading close to a shoulder if desired. The style S tap is built in fifteen sizes with a threading range for straight threads from ⅜ to 7½ inches.

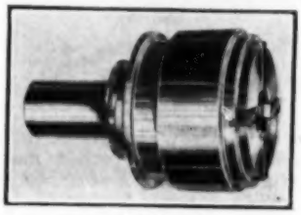
—250—

Diehead, Rotary-Opening, Style K/D

Geometric Tool Co., New Haven, Conn. [Vol.65,p.424]

The style K/D rotary opening diehead was designed for shoulder threading and is intended for use in screw machines, turret lathes, drill presses, and threading machines. The features claimed are: Quick release for removing and inserting chasers; complete inclosure with no pockets for chips or dirt; large chip clearance; large range of diameter with one size of head; and no overhang or screws to interfere with the threading of shouldered work.

The chasers used in the style K/D diehead are inter-



changeable with those for the corresponding sizes of K dieheads. The head is made regularly in five sizes, ⅞, 1⅛, 1, 1¼, and 1½ in. Other sizes can be obtained to order if desired.

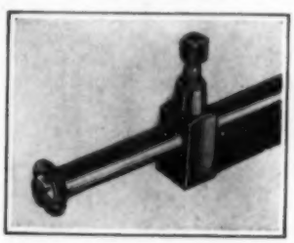
—251—

Threading Tool, Circular

F. J. Leggott, 20 *Cleveland St., Battle Creek, Mich.* [Vol. 65,p.430]

The circular threading tool illustrated can be adapted for either internal or external threading. A number of small flutes are broached in the hole of the circular cutter and these engage corresponding grooves milled in the end of the round tool-carrying bar. The cutter is held in place by means of a flat-head screw that engages a tapped hole in the end of the bar. With this construction it is possible to remove the cutter for regrinding without disturbing the setting of the bar on the tool slide.

The cutting point is placed on the center line of the work or slightly below it, and



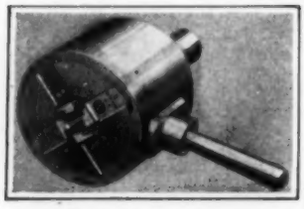
in this position it is claimed that the cutter will not slip nor hog into the work. The cutter is made from high-speed steel and is ground after hardening.

— 252 —

Diehead, Self-Opening, Style S

National Acme Co., Cleveland, Ohio. [Vol.65,p.546]

The style S diehead illustrated is for use on straight-away, close-to-the-shoulder threading or short threading. It can be applied to all types



of hand screw machines, turrent lathes, and other machines requiring a stationary diehead.

The shank of this tool rides on coiled springs so placed that when the thread has been cut to the desired length the chasers are automatically thrown open and pulled away from the work. The tool can be quickly disassembled for cleaning by removing two screws.

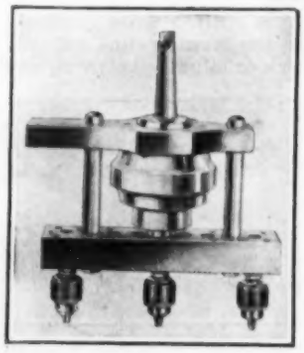
The size adjustment for the diehead can be made with a screwdriver without removing the die from its holder, and the adjusting ring is graduated for ready reference. Seven sizes are available covering a cutting range of from ⅛ to 2½ in. The sizes correspond with the range of the style R revolving type dieheads.

— 253 —

Tapping Head, Multiple

Chas. L. Jarvis Co., Gildersleeve, Conn. [Vol.65,p.885]

These heads can be made up with 2 to 6 spindles. The center distance can be set as low as ¾ in., in which case



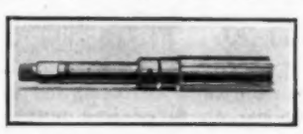
the chuck is removed and collet bushings are used to hold the taps. The head is designed to take care of taps up to ⅝ inch.

— 254 —

Reamer, Hand, Adjustable

Foster-Johnson Reamer Co., Elkhart, Ind. [Vol.65, p.75]

The blades of this adjustable hand reamer expand parallel and can be expanded when inserted full length into the work. The adjustment of the blades is effected through the medium of the knurled nut located at the top of the reamer. The bottom part of the nut is graduated to read the amount of expansion or contraction in thousandths of an inch. The blades of the reamer when expanded in the work do not enter the latter at once but are only firmly seated against



the walls until revolved. During the first quarter revolution the blades feed out to the full depth of the cut.

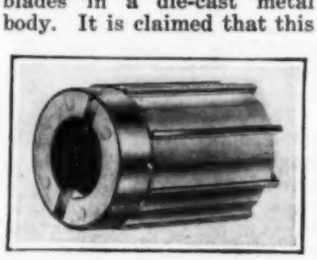
The reamer is built in five sizes, ranging from 1⅛ to 4⅛ in. The range of expansion varies from ⅛ in. on the 1⅛-in. reamer to ¼ in. on the 4⅛-in. size.

— 255 —

Reamers, Solid

Conradson Tool Corporation, 2659 Clay St., Detroit, Mich. [Vol.65,p.188]

The solid reamer is made by setting high-speed steel blades in a die-cast metal body. It is claimed that this



body has sufficient strength, ductility, and hardness to withstand any strain that this reamer would ordinarily be put to under working conditions. A steel tower protects the neck against abuse. The tool is designed to fit any standard arbor.

The reamers are made in 42 sizes, ranging from 1 7/16 to 3 in. in diam. The overall length varies from 2⅜ to 4 in. The diameter of the hole, at the large end, ranges from ⅜ to 1½ in., while Nos. 6 to 10 arbors are used with the reamers.

— 256 —

Reamer, Expansion, Spiral-Fluted, No. 717

Morse Twist Drill & Machine Co., New Bedford, Mass. [Vol.65,p.267]

It is said that the spiral flutes on the No. 717 expansion reamer illustrated make it an easy, free-cutting tool, and if there is a longitudinal

slot, keyway or chamber in the hole the reamer does not catch or chatter. It has long guides both at the top and bottom and is especially adapted for reaming piston pin holes. It is adjustable to a few thousandths of an inch oversize.

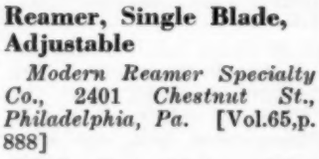
The reamer is made in sizes ranging from ⅜ to 1½ in. diameter. The length of flute varies from 1⅞ to 4½ in., while the overall length varies from 6¼ to 12 1/16 in. The length of the pilot is 2 in., except for a few of the smaller sizes.

— 257 —

Reamer, Single Blade, Adjustable

Modern Reamer Specialty Co., 2401 Chestnut St., Philadelphia, Pa. [Vol.65,p. 888]

This single-blade adjustable finishing reamer consists of a solid body with a groove in which is inserted a single blade. This groove may be



either spiral or straight. Set screws are used to hold the blade in position, both at the side and at the bottom so that a large range of adjustment is available. It is also possible to regrind the blade with an eccentric relief. Due also to this wide range of adjustment the blade can be reground many times.

— 258 —

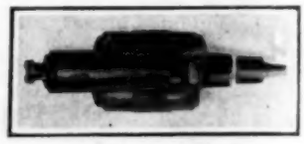
Chucks and Collets, Quick Change, "Wear-Ever"

Scully-Jones & Co., 2012 West 13th St., Chicago, Ill. [Vol.65,p.225]

A line of quick-change chucks and collets is being made by this company under the trade name "Wear-Ever." The chucks provide a means for changing tools without stopping the machine, and a series of operations such as drilling, reaming and tapping can be performed with a single spindle while the work is held in a fixed position.

The chuck is a cam type with two long rollers acting as the driving wedges. The main body of the tool can be furnished with a standard Morse taper shank or a straight shank. The remainder of the assembly consists of a knurled removable collar for engaging and releasing the collet, a collar spring, the collet itself and the two rollers. All parts are made of heat-treated steel.

The collets are made in several standard styles and are hardened and ground. Standard collets fit all size Morse taper-shank tools, and by means of adapters straight-shank tools, such as drills and taps, can also be



driven. Blank collets finished only on the outside can also be furnished.

The chucks are made in five sizes, accommodating taper shanks ranging from Nos. 2 to 6 Morse taper. The outside diameter of the chuck varies from 1 7/16 to 2⅝ in. The collets are numbered to correspond with the chuck numbers. No. 1 collet accommodates Nos. 0 and 1 Morse tapers, and No. 5 collet Nos. 3, 4 and 5 Morse tapers. Other sizes range between.

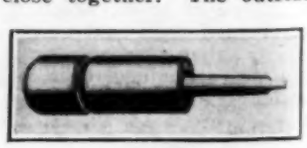
— 259 —

Chucks and Tool Holder

The Apex Machine Co., Dayton, Ohio. [Vol.65,p.731]

The safety tool holder is used in reaming, spot-facing, and counter-boring operations and also for tapping. In general, it may be used with any tool that is likely to stick and break. The device may be used for tapping pipe threads, and by setting the friction to the desired amount, the operator can tap the holes to uniform depth.

The close-center chuck may be used for drilling holes close together. The outside



diameter of the shank can be supplied in sizes as desired, while the shank is furnished in No. 1 and 2 Morse taper.

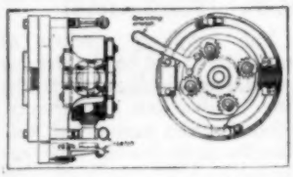
In order to eliminate the crowding of taps, and to compensate for taps having different leads or uneven starting, the vertical-float tapping chuck has been developed for use on multiple-spindle tapping machines. It is made in two sizes for handling standard taps up to ⅝ and ¾ in., respectively.

— 260 —

Chuck, Duplex, Gear

Garrison Machine Works, Dayton, Ohio. [Vol.65,p.619]

An adaptation of a standard duplex gear chuck to an indexing fixture for the purpose of accurately grinding deep holes of relatively small diameter from both ends of an automotive gear is announced. After the hole has been ground to the desired



depth from one end of the gear, the chuck is indexed through 180 deg. and the opposite end of the hole is presented to the wheel and the remainder of the grinding finished.

The construction of the fixture comprises a standard Garrison duplex chuck containing an indexing lug, mounted upon trunnions in ball bearings. The fixture is mounted on the faceplate of the grinder workspindle and latches are provided so as to automatically lock and hold the chuck in either position.

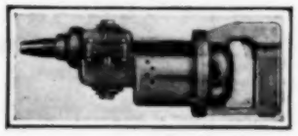
— 261 —

Hammer, Electric, Portable, Type B-2

Ajax Electrical Hammer Corporation, 117 *West* 63*rd St., New York, N. Y.* [Vol. 65,p.303]

The type B-2 electric hammer, was designed primarily for drilling and chipping materials such as brick, marble, cement, and metals. A chuck that holds standard tapered-shank drill points fits directly in the hammer and is provided with a handle for rotating the drill while in operation.

The hammer consists of only three moving units, the motor, the crankshaft assembly and the plunger, all of



which are housed in an aluminum frame. The plunger is thrown and not forced against the toolhead so that no shock is transmitted directly to the gears or to the motor. The hammer delivers approximately 2,400 blows per min. independent of the size of the drill or chisel being used.

The hammer is driven by a Universal motor and can be operated direct from any electric lighting circuit. It consumes 220 watts. It weighs approximately 10 lbs. and hence is readily portable. The control is by means of a trigger switch in the handle of the tool.

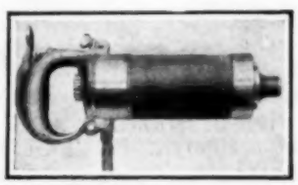
— 262 —

Hammer, Electric, Model 26, "Simbi"

Fermot Co., 200 *Broadway, New York, N. Y.* [Vol.65,p. 657]

The "Simbi" model 26 electric hammer, illustrated, is an improvement over the previous model, described on page 499, Vol. 64, of the *American Machinist.* The same electro-magnetic principle of operation has been retained, while several changes in mechanical design have been made.

The regulating lever for controlling the spring has



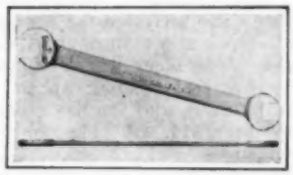
been replaced by a revolving knob type of regulator. A wider range of regulation is thus permitted and a longer spring is used. The intial upward pressure to the spring is applied through the plunger by means of a spiral spring wound edgewise, in place of the helical spring formerly used. The solenoid has been materially increased in size and the buzzing noise of the hammer has been greatly reduced. In the present design the feeding table is attached to the body of the hammer so that the operator's motions are not encumbered. It is claimed that the efficiency of the unit is 30 per cent higher.

— 263 —

Wrenches, Tappet and Check-Nut "Superrenches"

J. H. Williams & Co., Buffalo, N. Y. [Vol.65,p.75]

This line of chrome-molybdenum "Superrenches" has been especially designed for the adjustment of tappets. The wrenches have been made sufficiently long so as



to prevent burning the hands while working on the tappets of hot motors. They have thin heads and jaws. It is claimed that they are well adapted to use on check nuts. They are heat-treated and nickel-finished with the heads buffed bright.

— 264 —

Wrench, Pipe, 24-Inch

Lawson Manufacturing Co., 6505 *Carnegie Ave., Cleveland, Ohio.* [Vol.65,p.228]

This 24-in. pipe wrench is made entirely of drop-forged steel and has the movable jaw made integral with the handle. The latter feature is intended to add strength and

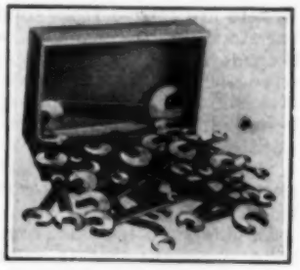
give accessibility with less assembled parts. A coil spring holds the jaw open so that the wrench can be put on a pipe by the use of only one hand. When the wrench is released, the spring tends to disengage it from the pipe and allows the wrench to be moved back for a new hold without injuring the teeth. The design is similar to the smaller wrenches made by this company.

— 265 —

Wrench Set, No. 650

Bonney Forge & Tool Works, Allentown, Pa. [Vol. 65,p.619]

The set of wrenches illustrated is for general repair work and is known as set No.



650. It consists of thirty carbon-steel wrenches in a wide range of sizes and types. The assortment includes double-end engineers' wrenches for U. S. S. and S. A. E. nuts and capscrews, valve-tappet wrenches and a special wrench for the reverse gear and brake-band adjustments on Ford cars.

The set has been especially selected for the repair shop or the mechanic requiring a complete assortment of wrenches. The wrenches are packed in an individual wooden container.

— 266 —

Wrenches, Right-Angle, Chrome-Vanadium

Bonney Forge & Tool Works, Allentown, Pa. [Vol. 65,p.814]

The chrome - vanadium right-angle wrenches have a 90-deg. angle of opening, and are designed for work in close quarters, where it is impossible to use a 15- or 22½-deg. opening. Advantage is taken of the strength of chrome-vanadium steel to make the

heads of the wrenches pear-shaped, so that they may get into close corners.

The wrenches are made in all standard openings from ⅜ to ¾ in. wide. Each wrench is guaranteed to strip the thread of any standard nut before the jaws will spread.

— 267 —

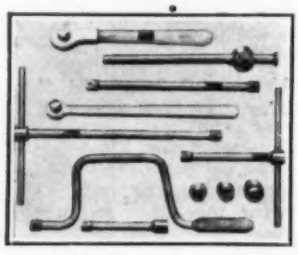
Wrenches, Socket, Detachable-Head

Bonney Forge & Tool Works, Allentown, Pa. [Vol. 65,p.971]

A complete line of detachable head socket wrenches made of chrone-vanadium steel is being marketed. The

sockets are forged from solid bar stock and the heads have been designed with sufficient strength so that the bolt will break or the thread will strip before the wrench is damaged. A thin wall is provided on the wrenches to permit their use for close corner work.

In addition to this complete line of sockets, this company has developed an assortment of handles for use with them, also forged of chrome-vanadium steel.



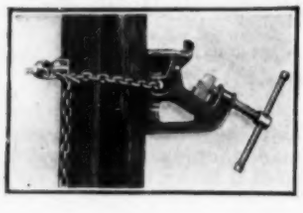
Solid offset handles, ratchet offset handled with reversible lugs, "T" handles of various lengths, sliding "T" handles, and ball bearing brace-type handles of various lengths are provided. Extension bars can be used with any of the handles for reaching otherwise inaccessible places. The socket heads have a ½-in. square lug. Adapters are also provided so that the handles may be used for very large sized sockets, having a ¾-in. square lug.

— 268 —

Vise, Post, Quick-Acting

Oster Manufacturing Co., Cleveland, Ohio. [Vol.65,p.431]

The quick-acting post vise illustrated is designed so that it grips and releases the pipe with one turn of the handle. The vise is of the inclined side opening type. It is equipped with oil-tempered, tool-steel jaws which it is claimed will grip the pipe securely without the danger of squeezing it out of round. The vise accommodates pipe sizes ranging from ⅛ to 2½ in. Short nipples can be handled since the jaws open wide enough to accommodate a 2-in. coupling. A special chain and clamp is provided for fastening the vise to a post where it is not possible to bolt it to a workbench. A special eyebolt is also furnished for use in pipe bending.



— 269 —

Block and Clamp, No. 751, "Handy"

Brown & Sharpe Manufacturing Co., Providence, R. I. [Vol.65,p.695]

The "Handy" block and clamp are intended for use as a V-block and clamp, anvil, or vise. The block has a capacity for round stock up to 1 in. in diam. and for flat stock up to ¾x1¼ in. The block measures 3x1¾x2 in. The "Handy" block and clamp is used for holding pieces while being milled, ground, or

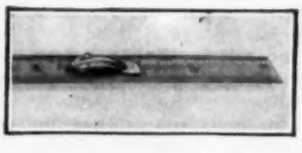
drilled; for straightening twisted pieces; or for centering round pieces. It is accurately machined and case-hardened.

— 270 —

"Klip" Rule

L. S. Starrett Co., Athol, Mass. [Vol.65,p.971]

The so-called "klip" is for use with a 6-in. flexible steel rule for pocket use. With this device, the rule is firmly held in the vest pocket or other part of the clothing.



The harder the rule is pulled, the more firmly it holds. It is released by applying downward pressure upon the pawl of the klip after it has become locked to the pocket of the vest or overalls of the workman.

The klip is permanently soldered at the 4-in. mark which is considered the average pocket depth.

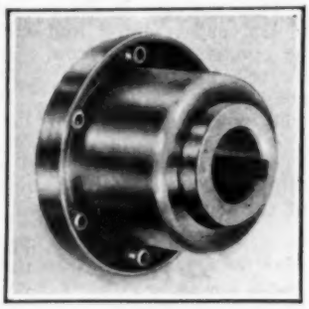
Miscellaneous Equipment

— 271 —

Coupling, Flexible

Falk Corporation, Milwaukee, Wis. [Vol.65,p.691]

The coupling consists of two flanged steel disks that are keyed to the respective shafts of the driver and driven units, the connecting



pieces, and a steel shell that incloses the holder and protects the coupling from dirt and at the same time retains the lubricant. The connecting pieces are tempered steel spring segments which fit into slots in the disk.

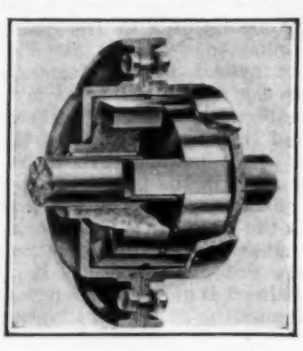
The construction is such that the machine can be disconnected without disturbing either of them. Alignment of the coupling is accomplished by means of a short straight edge and a set of feelers. The coupling is made in standard sizes ranging from ¼ to 30,000 hp. at 100 rev. per minute.

— 272 —

Coupling, Flexible Shaft

W. H. Nicholson & Co., Wilkes-Barre, Pa. [Vol.65, p.812]

The flexible shaft coupling has been designed to compensate for misalignment and to permit a liberal amount of lateral float. The coupling consists of two cast-steel hubs keyed to their respective shafts, and in which dove-tail slots are cut to receive floating steel keys having beveled sides. Three keys are used in the smaller couplings, and 5 in the larger sizes.



The working parts of the coupling are inclosed in a cast-iron casing made in two halves. This casing is firmly secured to one hub. It keeps dirt out and the oil in, and limits the lateral movement of the floating keys in the slots.

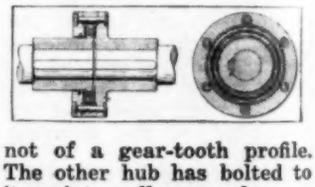
The coupling is made in 16 sizes for shafts ranging from ¼ to 12 in. in diameter.

— 273 —

Coupling, Flexible

J. Y. Dahlstrand, Scio, N. Y. [Vol.65,p.1088]

The coupling consists of two hubs keyed to the driving and driven shaft respectively. One hub has externally-hobbed claws somewhat similar to gear teeth, although



not of a gear-tooth profile. The other hub has bolted to it an internally-cogged member of much larger diameter. In addition, there are two floating rings with teeth on both the inside and outside circumferences that are interposed radially between the two hubs; one of these floating rings is split. The whole assembly is tightly closed and is lubricated by means of grease which is injected through a connection in the side of the coupling.

The coupling is made of steel throughout so that it can be operated at high speed. It is free to move endwise to the extent of ¼ in. It is designed to permit of a considerable degree of angular misalignment and to have tortional flexibility.

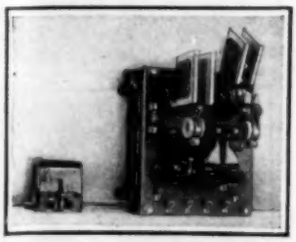
— 274 —

Controller, Magnet, "Push-the-Button"

Ohio Electric & Controller Co., Cleveland, Ohio. [Vol.65, p.187]

The push-button master switch and control panel illustrated is for use with lift-

ing magnets. On the master switch two levers are exposed, one for lift, the other for drop. A barrier between the two prevents the accidental mixing of the levers.



This switch can be attached to the ceiling or side wall of the hoist cab, or the throttle of a locomotive crane to be operated by thumb or finger pressure, or by foot pressure if it be placed on the floor.

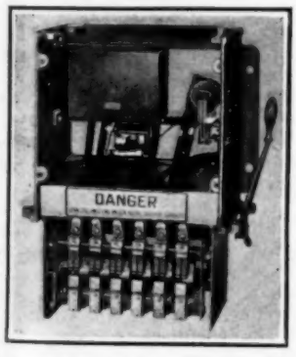
The switch is the double-pole type. All contacts have a wiping action and are self-cleaning. Fuses are also provided. The control panel is 16 in. high, 14½ in. wide, and 14 in. deep.

— 275 —

Compensator, Mill Type, No. 2

General Electric Co., Schenectady, N. Y. [Vol.65,p.575]

This compensator will control units above 30 hp. on 220-volt circuits and above 60 hp. on 440- and 550-volt circuits. Two part construction is used; one unit consists



of an oil-immersed, double-throw switch with temperature overload relay, push-button station and under-voltage release; the other unit consists of an auto-transformer.

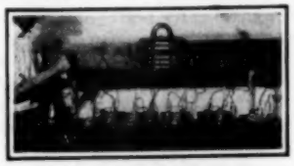
The control box is so arranged that the oil box may be lowered to permit examination of the switch parts and renewal of fingers and wedges. This unit can be mounted on the wall or attached to a pipe support. The conduit box mounted on the top of this case provides ample room for making connections.

— 276 —

Battery Panels, Charging, "HB"

Hobart Bros. Co., Troy, Ohio. [Vol.65,p.810]

The battery charging panel uses plugs instead of knife switches. It contains four separate lines. One line carries the regular charging rate, the second line gives the ammeter reading of any



battery plugged in on it, the third line provides a resistance of 5 amp. and the fourth a resistance of 10 amp. Ten batteries can be handled at one time.

— 277 —

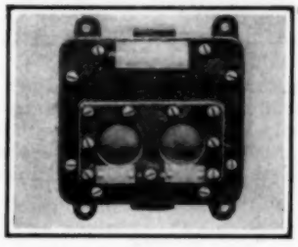
Switch, Push-Button

General Electric Co., Schenectady, N. Y. [Vol.65,p.889]

A number of improved push-button stations for use with various types of industrial magnetic control equipment are being marketed.

A standard dust- and water-tight push-button station for use in cement mills, coke plants, and the like is shown in the illustration. This control unit has silver contacts inclosed in a malleable iron box with a leather diaphragm between the buttons and the holes in the cover.

Where it is necessary to have contacts immersed in oil to minimize the danger of explosions or to prevent corrosion of the copper contacts, the push button sta-



tions bearing the designation BS-11-CL and BS-12-DK are offered.

A three-button station designated as BS-73 has been developed for light duty without plugging. This control is recommended for window opening service, valve control, and the like.

A push-button station provided with protector indicating lamp is covered by types BS-11-DP, BS-12-HV, and BS-12-HW.

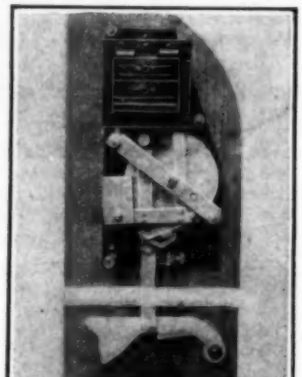
An improved line of stations for back-of-panel mounting where the front is to be flush with the front of the base has also been announced.

— 278 —

Compensator, Hand-Starting, Attachment, Time-Delay

General Electric Co., Schenectady, N. Y. [Vol.65,p.933]

The time-delay attachment is for use with hand-starting compensators to provide undervoltage protection during brief disturbances in industrial power circuits. The attachment bears the designa-



tion CR-2820-1062. It can readily be mounted on a hand starting compensator in the same supporting holes as used for the standard under-voltage release.

Time-delay is accomplished by means of a falling solenoid plunger, the downward movement of which is retarded by means of a flywheel, which it drives through a rack and pinion.

— 279 —

Instruments, Electrical, Portable, Types HTD and HTA

Roller-Smith Co., 233 Broadway, New York, N. Y. [Vol.65,p.654]

These portable instruments are being made in types HTD and HTA for use with direct and alternating current, respectively. The dimensions of the instruments are 3$\frac{5}{32}$ in. wide, 4½ in. high and 1½ in. deep. All scales are 2.1 in. long.

The cases are made of light but rigid metal with black rubberoid finish, and are practically dust and moisture proof. Connections are in the form of binding posts.

All instruments are provided with a convenient zero adjuster. They are said to be accurate within ¼ per cent of the full scale value in the direct current, and within 1½ per cent of the value in the alternating current instrument.

The type HTD instruments are made with ammeter, milli-ammeter, voltmeter, milli-voltmeter and volt-ammeter scales. Maximum ranges are 800 milli-amperes, 200 amperes, 300 volts, and 500 milli-volts.

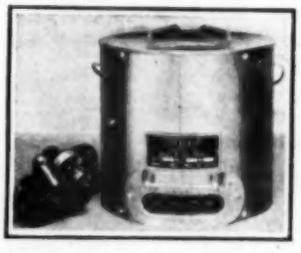
The type HTA a.c. instruments are furnished with ammeter, milli-ammeter and voltmeter scales. The maximum ranges are 800 milli-amperes, 50 amperes, and 300 volts.

— 280 —

Melting Pots, Electrical, Portable, 10-Pound

Harold E. Trent, 259 North Lawrence St., Philadelphia, Pa. [Vol.65,p.266]

Two electrically heated melting pots of 10 and 20 lb. capacity had been added to the line of Trent products. The pots are suitable for melting babbitt metal, solder,



lead, tin and other metals of low temperature melting points.

Three temperature stages are available by means of three plugging positions. Contact prongs are protected from abuse by being inset in the body of the pot. The pots are fitted with spouts and two handles to facilitate pouring metals. The heating elements are fully insulated by means of a refractory material between the element and the casing, which is sheet steel, finished with aluminum paint.

— 281 —

Melting Pot, Metal, Electrical, 1,000-Pound

General Electric Co., Schenectady, N. Y. [Vol.65,p.617]

This 1,000-lb. electrical metal melting pot is essentially the same as other standard General Electric melting pots except that three

cast-in, sheath wire, immersion heating units are used instead of two.

Each heating unit is rated at 5 kw. The pot may be operated either on 110- or 220-volt, a.c. or d.c. circuits. The pot consists of a sheet-steel cylindrical casing, in which is supported a cast-iron crucible. The crucible measures 18 in. in diam. and 15 in. in depth.

The pot is designed for melting lead, babbitt, tin, solder, and similar alloys or metals with the exception of spelter or zinc, at temperatures not exceeding 850 deg. F. Full automatic control is recommended and a standard control panel with a temperature control instrument equipped with a special bulb for metal immersion completes the equipment.

— 282 —

Melting Pot, Metal, Electrical, 100-Pound

Harold E. Trent Co., 259 North Lawrence St., Philadelphia, Pa. [Vol.65,p.1083]

The electrically-heated metal melting pot shown in the accompanying illustration is intended for melting

solder, lead, babbitt, tin, and similar low melting point metals. Its capacity is 100 lb. of lead.

A cast terminal box is provided at the bottom of the pot for BX connection or connection to a rigid metal conduit.

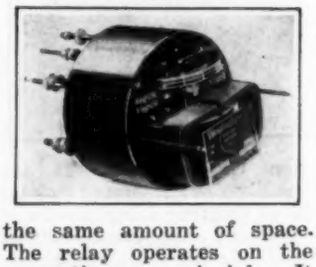
The pot is made portable by means of semi-rigid eyebolts secured on the rim of the casting. The crucible is of a special grade of cast iron. The casing is made of sheet steel with welded seams reinforced with steel bands. The pot can also be used for melting salts requiring a temperature less than 1,000 deg. Fahrenheit.

— 283 —

Relay, Resistance-Measuring, Type XM

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa. [Vol.65,p.37]

This resistance-measuring relay, type XM, for use with direct current, resembles the Westinghouse induction type a.c. relay and occupies about



the same amount of space. The relay operates on the magnetic-vane principle. It possesses adjustable features so that operating current and voltage, as well as operating time can be set.

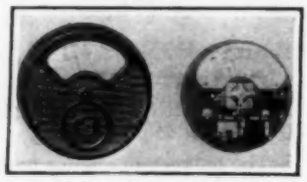
This relay has been developed for use in conjunction with automatic service-restoring circuit-breakers. It is claimed that it actually measures the resistance of the feeder and that it recloses the breaker when indications are that the short circuit has cleared.

— 284 —

Relay, D.C., Type SR

Roller Smith Co., 233 Broadway, New York, N. Y. [Vol.65,p.306]

With a few modifications in each case, the Type SR d.c. relay can be made to serve as a reverse current relay, an overload, underload or "closed-circuit" underload, overvoltage, or undervoltage relay. The scales are longer and the torque has been increased over former models and the accuracy is said to be greater. The instrument



is used in connection with a circuit breaker.

The instrument mechanism has attached to its pointer a platinum spring contact that contacts with a similar piece carried by an adjustable pilot needle. The latter is set by means of a slotted head projecting from the front of the case. The circuit established by the buttons energizes the electromagnet that controls the relay switch and in turn the circuit breaker. The relay can be used with all capacities of circuit breakers.

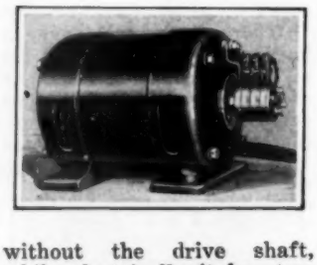
— 285 —

Frequency Changer

Forbes & Myers, 172 Union St., Worcester, Mass. [Vol.65, p.36]

This frequency changer is intended for use with a standard two-speed induction motor, so that four speeds in all can be obtained. When operated on 60-cycle current the frequency changer gives 240 cycles, and motor speeds of 1,800, 3,600, 7,200, 14,000 r.p.m. are available. The capacity is ½ kva. which is sufficient for a ½-hp. motor.

Mechanically the frequency changer is identical with the slipring induction motor



without the drive shaft, while electrically it has two sets of windings, one of which is used to rotate the machine, the other for changing the frequency.

— 286 —

Test Equipment, "Trouble Shooter"

Universal Test Equipment Co., 2939 North Oakley Ave., Chicago, Ill. [Vol.65,p.187]

The "Trouble Shooter" illustrated is for use in locating grounds, open and short circuits, and other electric troubles. The device consists of a pair of testing handles made of "Thermoplex" which is heat and shock proof, lead wires, and a special separable socket and plug. The handles have removable caps so that different sizes and lengths of lead wires can be inserted. Pointed steel prods are used to make contact. Two 5-ft.

lead wires are furnished held together with pure gum sleeves.

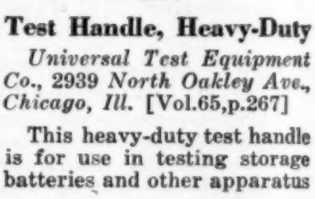
The plug fits any standard a.c. or d.c. lamp socket, while the socket and the plug is standard for holding any size test lamp.

— 287 —

Test Handle, Heavy-Duty

Universal Test Equipment Co., 2939 North Oakley Ave., Chicago, Ill. [Vol.65,p.267]

This heavy-duty test handle is for use in testing storage batteries and other apparatus



where a large amount of current may be encountered. The handle has a removable cap, and is made of a special insulating material.

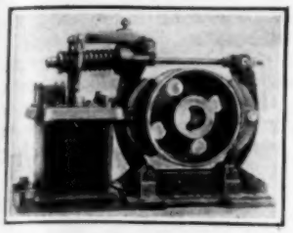
The grip is 1 in. in diameter. A pointed steel prod, heavily plated so as to be rust and acid proof, extends 3 in. from the grip. The other end of the prod extends through the grip and the upper part of it is slotted for the insertion of any size wire up to No. 8 B. & S. wire gage.

— 288 —

Magnetic Brake

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa. [Vol.65,p. 305]

The types DI and AI magnetic brakes are for use with both d.c. and a.c. The AI brake is illustrated. The small diameter of the brake wheel is said to require less power to operate, and less



time for stopping and starting. The braking mechanism is spring set, and is easily adjusted. A manual release enables the motor to be operated without the brake during inspection or test. The brake shoes are self-aligning so as to prevent lateral strain upon the motor shaft.

The magnet proper is incased in a weatherproof cast-steel housing. Ventilation is provided by hooded openings in the cover and cored holes in the base.

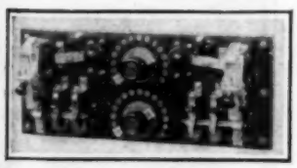
— 289 —

Battery Charging Outfit

General Electric Co., Schenectady, N. Y. [Vol.65,p.386]

This company is marketing a complete line of improved battery-charging equipment in uniform frame sizes. The equipment consists of motor generators and unit control sections.

The generators are flat compounded between no load and three-quarter load, and



have slightly drooping characteristics beyond the three-quarter load. The standard voltage is 115, but special voltages, such as 32, 45 and 55 volts, can be obtained.

The charge is terminated by means of a contact-making ampere-hour meter located on the truck. The panel contains for each circuit a dial switch for the resistor, a meter reading switch, an indicating lamp, a double-pole under-current and shunt-trip contactors with two auxiliary circuit contacts, a fuse, and a resistor.

Overcurrent protection is provided by the fuse, and protection against reversal of current is furnished by the undercurrent contactor. Automatic shutdown at the end of the charge is accomplished by a shunt trip device.

— 290 —

Electric Ring Expander, "Calorac"

Humil Corporation, 52 Vanderbilt, New York, N. Y. [Vol.65,p.618]

The "Calorac" electric ring expander employs the induction-transformer principle for developing the necessary heat in the ring.

The machine consists of a transformer with the top member of the core hinged for opening to permit the

rings being placed over the vertical core. The ring becomes the secondary of the circuit. The top member is held in tight engagement magnetically by the flux in the core.

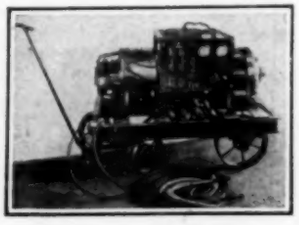
The machine measures 18½ by 40 in. and weighs 850 lb. It has a full-load capacity of 12 kva. Any type of ring may be heated on this machine, and rings up to 30 in. in diam., and weighing over 200 lb. have been successfully handled. The machine may also be used for heat-treating up to 1,200 deg. F. Pyrometer control is optional.

— 291 —

Welding Generator Set, Type S

Wilson Welder & Metals Co., Inc., Hoboken, N. J. [Vol.65,p.1087]

The welding capacity of the standard Type S "Plastic-Arc" welding machine has been increased to 300 amp. The complete rating of the equipment is 200 amp. continuous duty on fixed resistance; 250 amp. for one hour, with 50 deg. rise on fixed resistance; and 300 amp. continuous hand welding.



A feature of this machine is that it is possible to weld metal of a minimum thickness of $\frac{1}{16}$ inch.

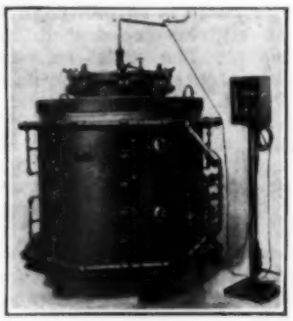
— 292 —

Furnace, Gas-Carburizing, Vertical

American Gas Furnace Co., Elizabeth, N. J. [Vol.65,p. 429]

The vertical gas-carburizing furnace illustrated is especially designed for carburizing large parts, such as gears, shafts, crankshafts and the like that cannot be conveniently treated in the horizontal retort-type furnace. The vertical retort is cylindrical in shape and is made of a heat-treated alloy.

Uniform heating of the retort is obtained by means



of a large number of small gas burners spaced uniformly around the circumference and in equal tiers from the top to the bottom of the furnace and arranged to fire tangentially into the annular combustion chamber.

Simple fixtures can be used to hold the crankshafts and other odd-shaped pieces in position. The furnaces are made in various sizes, with retort ranging from 15 to 30 in. in diam. The depth of the retort is 30 in. in all sizes.

— 293 —

Furnace, Electric, Box-Type

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa. [Vol.65,p. 654]

The box or hearth-type electric furnace illustrated is particularly applicable to production heat-treating of machine parts.

The furnace is constructed of a shell of heavy boiler plate, riveted and bolted to a structural steel frame, with heavy front castings. Within this shell the heat insulations and the heating chamber are inclosed. The entire roof is assembled in a frame and can be lifted and swung to one side.

The heating elements made of nickel-chromium are open but protected, and are assembled in a frame of the same metal. A cast nickel-chromium floor plate protects the bottom elements.

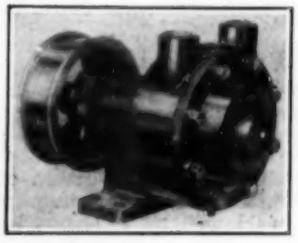
By means of automatic regulation the furnace can be controlled within close temperature limits, up to a maximum of 1,850 deg. F. Three sizes of furnaces are built having capacities at 1,500 deg. F., of 100, 240 and 360 lb. of steel per hr., with power consumption of 15, 27 and 40 kw., respectively. The smallest size furnace is for use on single-phase, 110-volt current; the middle size is for operation on the same phase and voltage, while the larger size is designed for 1, 2 or 3-phase, 220-volt current.

— 294 —

Pumps, Reversible-Flow

Tuthill Pump Co., 131 W. 63rd St., Chicago, Ill. [Vol.65, p.1085]

This improved type of gear pump has been designed especially for machine tool purposes. It comprises a housing in which rotates an internal or driving gear



and an idler or driven gear, together with a crescent-shaped member which completely fills the space within the internal gear. The pumping action is continuous.

The space between the intake and discharge sides is sealed by a hardened steel land held in place by a light spring. This member adjusts itself vertically to maintain the amount of flow allowed at the discharge. The balanced lands of the pump allow small chips, grit and other particles to pass without cutting away the closely fitted walls.

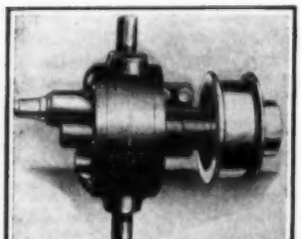
The crescent and idler gear are mounted on a separate member attached to the cover. By rotating the cover 180 deg., the direction of rotation is reversed.

— 295 —

Pump, Coolant, Reversible, "Trahern"

George D. Roper Corporation, Rockford, Ill. [Vol.65,p. 267]

The reversible coolant pump is intended for use on metal working machines to handle water, oil, or any cutting compound. The pump is especially designed for use



on reversible machines, but is adaptable for any type of metal working machine. It is made in four sizes with capacities ranging from 1 to 26 gal. per minute.

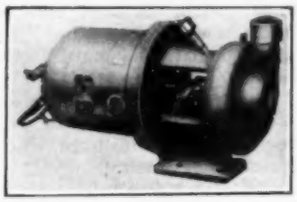
To relieve the pump from strain from the belt pull, an extended bearing has been cast integral with the back plate. The pump is of the rotary geared type. A relief valve is built into the face plate, and this valve acts as an unloader, automatically by-passing all excess flow from the pump.

— 296 —

Pump, Centrifugal, Coolant, Motor-Driven

Goulds Pumps, Inc., Seneca Falls, N. Y. [Vol.65,p.387]

A small motor-driven centrifugal coolant pump for machine tools has been



placed on the market. The pump proper is identical with the coolant pump described on page 842, Vol. 64, of the *American Machinist*.

The design of the pump is such that it will pass chips without clogging or producing undue wear. The casing is bolted to the frame with eight studs, and the discharge can be placed in any one of eight directions. The pump itself will operate in any position.

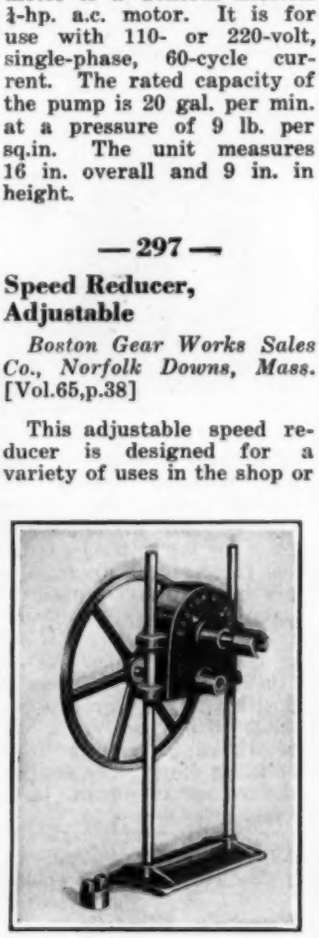
The motor will also operate in any position. Its weight is carried on a separate thrust bearing. The motor is a General Electric ¼-hp. a.c. motor. It is for use with 110- or 220-volt, single-phase, 60-cycle current. The rated capacity of the pump is 20 gal. per min. at a pressure of 9 lb. per sq.in. The unit measures 16 in. overall and 9 in. in height.

— 297 —

Speed Reducer, Adjustable

Boston Gear Works Sales Co., Norfolk Downs, Mass. [Vol.65,p.38]

This adjustable speed reducer is designed for a variety of uses in the shop or



for home application. It consists of a compact gear transmission box, fitted with "Boston" standardized gears. The gear box is adjustable vertically on two upright arms, which are held in a light but rigid base. The gears are standard and are interchangeable.

— 298 —

Speed Reducer, Type A-X

Philadelphia Gear Works, Richmond & Tioga Sts., Philadelphia, Pa. [Vol.65,p. 265]

The type A-X speed reducer illustrated was especially designed for conditions that require an overhung load such as that coming from a pinion or sprocket on the worm gear shaft. In order to take care of such an overload condition the shaft is of large diameter and is mounted upon roller bearings.

The worm and shaft are integral and are made of

high-grade alloy steel. The worm threads are hardened, then ground. The wormgear consists of a chilled cast-bronze rim, shrunk on and pinned to a cast-iron center.

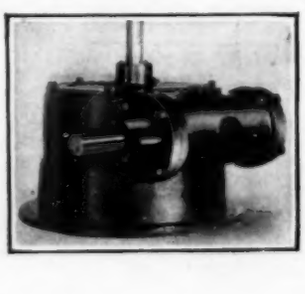
The type A-X units are available for various horsepowers up to 200 and in practically any desired ratio of reduction. The worms may be placed above the gear, below the gear or in a vertical position.

— 299 —

Reduction Unit, Worm

Winfield H. Smith, Springville, N. Y. [Vol.65,p.387]

Three worm gear reduction units of small capacity have been added to the line of this company. The No. 8 vertical reducing gear is shown. Reductions of 40 to 1, 20 to 1 and 10 to 1 can be furnished with corresponding capacities of 2, 3, and 5 hp., respectively, at 1,800 r.p.m. of the worm shaft. The driven



shaft can be taken off either at the top or the bottom.

The No. 2½ reducing unit is for use with motors up to ½ hp. capacity. The standard reduction is 40 to 1. Bronze bearings are used in the high speed shaft.

The No. 3-A reducing unit is for use with motors up to ¾ hp. capacity. Reductions of 20, 10 and 5 to 1 are available as standards. The essential dimensions are the same as those of the No. 3 unit which it supercedes.

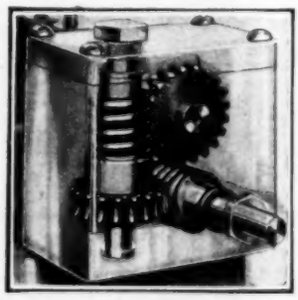
— 300 —

Speed Reducer, Fractional-Horsepower

Hill-McCanna Co., 2025 Elston Ave., Chicago, Ill. [Vol.65,p.509]

The fractional-horsepower speed reducer illustrated is available in ratios ranging from 50 to 1 to 400 to 1 in a space of 4x2x4 in. A combination of two pairs of worms and wheels is used.

The worms are of hardened steel and the wormwheels are of bronze. The entire mechanism operates in a grease-tight, dust-proof case. Stuffing boxes are used at the points of entrance of the high- and low-speed shafts to retain the grease. The high-speed shaft is ½ in. in diam. It is connected to the driving



motor by means of a flexible coupling. A pulley can also be mounted upon the shaft for belt drive. The unit is suitable for use with motors up to ½ horsepower.

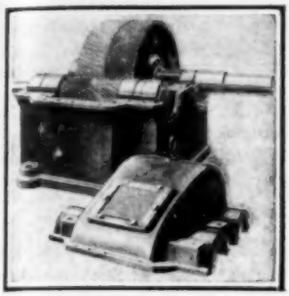
— 301 —

Speed Reducers, Herringbone, Continuous-Tooth

D. O. James Manufacturing Co., 1114 West Monroe St., Chicago, Ill. [Vol.65,p. 887]

This company has developed a continuous tooth, herringbone gear for use in speed reducing units. This type of gear embodies the double helical principle. Each individual tooth is brought to

an apex and has the shape of a completed "V." The tooth is generated with a curve or twist so that the same profile is presented both in the normal plane at right angles



to the helix angle and in the diametral plane at right angles to the face.

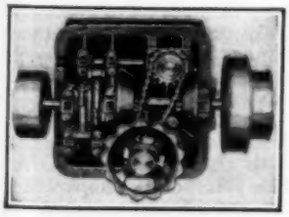
The teeth are of involute form and are cut with a 20-deg. pressure angle and a 30-deg helix angle. The addendum of the tooth is 0.8 divided by D. P. and the dedendum is 0.1 divided by D. P. An overlap of approximately 50 per cent is obtained. These units are being built in ratios ranging from 2 to 1, to 150 to 1, and carrying loads from 2 to 200 horsepower.

— 302 —

Transmission, Variable Speed

Driscoll Transmission Corportation, 416 West 33rd St., New York, N. Y. [Vol.65,p. 1006]

With this mechanical speed reducer, any desired speed ranging from 0 to 1,750 r.p.m., the maximum rated speed of the prime mover, can be obtained at the power delivery and the change of speed can be made continu-



ously, by means of a hand-wheel, without an interruption in power. The unit is rated at 1 hp. All moving parts operate in a bath of oil in a dust-proof case. The steel parts are carefully heat-treated. The operation is by means of two variable-throw cranks that oscillate sleeves carrying quick-acting clutches. The other halves of the clutches are keyed to the driven member, which rotates by means of the impulses transmitted through them.

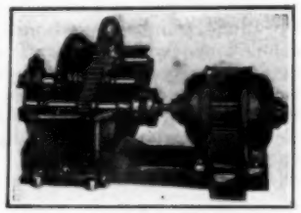
— 303 —

Speed Reducer, Roller-Chain

Washington Machinery Depot, Tacoma, Wash. [Vol.65, p.1087]

This speed reducer unit uses roller chain made by the Diamond Chain & Manufacturing Co., Indianapolis, Ind. On the main drive, triple-strand chain is used, and on the two reduction drive, single-strand. The entire mechanism is enclosed and the chains and sprockets run in a bath of oil.

It is said that the use of roller chain permits the transmission of power in one direction without the use of idlers. Furthermore, it is claimed that the particular advantage of this design is that the original transmis-



sion efficiency and silent operation is preserved because of the inherent characteristic of roller chain whereby any wear on the chain or the sprockets is automatically absorbed by the act of the chain riding higher on the cut-steel sprocket teeth.

— 304 —

Drives, Silent-Chain

Link Belt Co., 910 So. Michigan Ave., Chicago, Ill. [Vol.65,p.851]

Stock sizes of link-belt silent chain drives are now available from distributors at ratings from ½ to 15 hp. in almost any reduction ranging from 1 to 1 up to 7 to 1. Formerly these stock sizes were carried only as high as 10 horsepower.

— 305 —

Spray, Paint

Alexander Milburn Co., 1416 West Baltimore St., Baltimore, Md. [Vol.65,p.34]

This paint spray is light in weight and of a simple design so as to prevent clogging. The device consists of a cover, body, atomizer and handle.

The paint enters a large annular chamber surrounding the air nozzle, from which it is atomized and expanded in a venturi. The

atomization is regulated by turning a nozzle to secure a large or small spray or to entirely shut it off, leaving only a stream of air which can be used for dusting purposes. A pressure of 40 lb. per sq.yd. is recommended.

— 306 —

Paper, Printing, "Ozalid"

Eugene Dietzgen Co., 954 Fullerton Ave., Chicago, Ill. [Vol.65,p.851]

This so-called "Ozalid" printing paper produces a positive print with a dark red or maroon line on a light cream background direct from the original tracing without the use of a negative. It is printed in the same manner as blueprints, but is developed dry by brief exposure to ammonia water vapors. The print produced is non-fading and can be shaded and colored, or written upon with pencil or ink. Prints made on thin "Ozalid" paper can be used as originals from which other prints can be made.

— 307 —

Air Compressors

Hardie-Tynes Manufacturing Co., Birmingham, Ala. [Vol.65,p.1088]

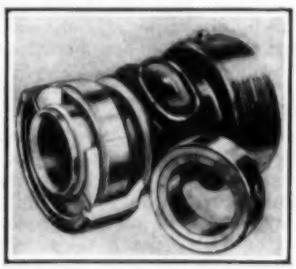
This company has announced the addition of a new line of air compression machinery. The compressors can be operated either by electric or steam motors and are equipped with an improved valve system patented by this firm.

— 308 —

Hanger Box, Ball Bearing,

T. B. Wood's Sons Co., Chambersburg, Pa. [Vol.65, p.226]

Fafnir ball bearings are now used in a standard line of hanger boxes made by the above company and marketed under the name of "V.G." products. The housings are made in several styles with bosses designed to suit different types of hanger frames, so that plain babbitted bearings can be replaced without disturbing the hangers. The box is the so-called dumb-bell type, and it carries a single-row ball bearing at each end. Inclosures are provided to keep dirt out and to retain the lubricant. It is said that lubrication is necessary only twice a year. The lubricant is introduced into the box



through two tap holes that are fitted with standard pipe plugs.

The boxes require no adjustment when they are mounted on the shaft. The box is slid along the shaft into place and two locking collars are setscrewed in place after the frame bolts have been drawn up.

— 309 —

Welding Torch, Style 7700

Air Reduction Sales Co., 342 Madison Ave., New York, N. Y. [Vol.65,p.224]

The style 7700 Airco-Davis - Bournonville welding torch has been placed on the market by the above company. When used with oxygen of a purity of 99.5 per cent or better, this torch has a gas consumption ratio of 1.01 volumes of oxygen to 1.00 volumes of acetylene.

Three extension tubes, 6, 9 and 16 in. in length, and ten welding tips ranging in size from Nos. 1 to 10 are provided. The acetylene consumption of the various tips ranges from 2.4 to 89.9 cu.ft. per hr. The hose connections are straight and are for use with ¼-in. hose. Quick-acting needle valves control the gases.

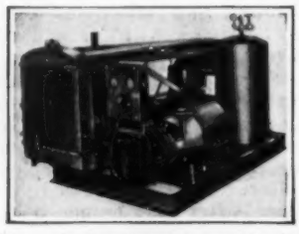
—310—

Welder and Air Compressor, Combination

Schramm, Inc., West Chester, Pa. [Vol.65,p.344]

A combination arc welder and air compressor driven by a gasoline engine and mounted upon a single base, has been placed on the market. The unit consists of a Buda gasoline engine, a Schramm compressor and a General Electric Welding outfit. The complete equipment may be mounted on a standard two-ton truck or can be made portable by adding steel or rubber-tired wheels to the frame.

The Buda engine is rated at 24 hp., 800 r.p.m., and may be started and operated independently either of the compressor or the welding generator. The Schramm compressor is a two-cylinder water-cooled machine with a capacity of 120 cu.ft. per min.



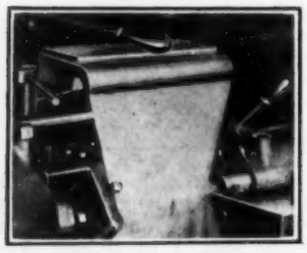
The air receiver is 18 in. in diameter by 42 in. high. The General Electric welding equipment consists of a belt-driven WD-12 arc welding generator, together with the necessary equipment. The total weight of the unit is 4,000 pounds.

—311—

Distributor, Coolant

Goulds Pumps, Inc., Seneca Falls, N. Y. [Vol.65,p.422]

The coolant distributor illustrated consists of an inclosed tray with suitable baffles for producing an even



flow of liquid over the lip, which is in the form of an elongated spout.

The device is a two-piece aluminum casting. It is designed for use with a 1-in. pipe, which enters at the bottom near the rear.

—312—

Work Stand, Universal

Tomkins - Johnson Co., Jackson, Mich. [Vol.65,p.431]

The universal work stand illustrated is particularly designed for holding die-blocks but may be adapted for other uses by means of special attachments.

The die-block is held on the stand by means of a vise.

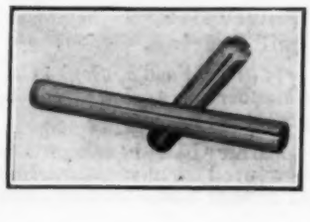
The stand is adjustable for height and direction so that the die sinker can turn the die block in any position while he works on it. A ball and socket joint is used to obtain this directional feature.

—313—

Pin, Self-Locking

Groov-Pin Corporation, 45 *Thirty-eighth St., Long Island City, N. Y.* [Vol.65,p. 509]

The self-locking pin illustrated is for use in fastening machine parts. The pins are designed to eliminate the reaming of drilled holes. The pin is manufactured by grooving a cold-drawn alloy steel cylindrical pin on three sides. The grooves are made wider at the upper end and gradually narrow until they disappear a short distance from the other end of the pin. Two lengths of grooves are furnished. One extends approximately 80 per cent of the length of the pin and the other one-half



the length. These grooves form three sectors which are pressed out in proportion to the depth of the groove. In this way the pin becomes tapered from the lower to the upper end.

The pins are available in sizes ranging from $\frac{1}{16}$ to $\frac{1}{4}$ in. in diameter.

—314—

Lens, Welding, "Immunite"

Strauss & Buegeleisen, 30 *Front St., Brooklyn, N. Y.* [Vol.65,p.548]

It is claimed that the "Immunite" welding lens is optically ground and polished to an exact plane. The lenses are designed to meet the requirements of the most recent specifications of the United States Navy. They can be ordered and specified by shade numbers and with each lens a certificate is given specifying the absorption of ultra-violet and intra-red rays, visibility, and the total energy transmitted by each lens.

—315—

Torch, Venturi Suction

Hauck Manufacturing Co., 126 *Tenth Street, Brooklyn, N. Y.* [Vol.65,p.616]

The Venturi suction torch operates on the aspirator principle, so that there is no pressure on the oil in the

tank or in the hose at any time. As soon as the suction ceases, the oil flow stops simultaneously. The outfit consists of the torch and an oil tank mounted upon wheels and oil and air lines. The air line is for connection to an outside source of air pressure.

The burner is made of sheet steel and pipe while the nozzle is made of cast iron. It can be readily dismantled for cleaning. The oil and air hose are made according to special specifications to withstand the conditions they are subjected to. The oil tank is made of seamless drawn pressed steel with the bottom interlapped and brazed. The fitting connections are welded.

The torch operates on fuel oil as heavy as 28 deg. Baumé and on all lighter oils and distillates. The usual air pressure ranging from 50 to 100 lb. per sq. in. is required and the torch can be operated 14 ft. above the level of the tank.

—316—

Ball Bearings, "Schubert"

McGill Metal Co., Valparaiso, Ind. [Vol.65,p.618]

This company is marketing a deep-groove type ball bearing in standard sizes, both single and double row. It is claimed that the dimensional tolerances have been reduced to approximately

one-half of the standard S.A.E. tolerances. The bearings are capable of carrying axial or thrust loads in either direction.

The retainer of the bearings is made of die-cast McGill metal, a modified aluminum bronze, with physical properties closely approximating mild steel.

The ball pockets are cylindrical, and the ball contacts with the retainer in a line. The retainer is supported on the ground and polished land of the inner ring.

—317—

Ink Stand, Draftman's Pen-Filling

National Tool Engineering Co., P. O. Box 712, *Indianapolis, Ind.* [Vol.65,p.692]

The draftsman's pen-filling ink stand is made of gray iron castings, painted on the inside as well as the outside with "Duco Ivory." The bowl is one piece with the body of the casting, and it is

large enough to hold the contents of the standard 25-cent bottle of drawing ink.

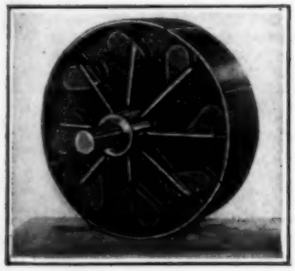
The top has a soft rubber pad that fits snugly onto a machined surface on top of the bowl. When swung all the way back it will stay open so that a writing pen can be dipped in the bowl without interference. For filling the ruling pen, a standard pen point that fits into a standard penholder is used.

—318—

Expansible Pulley

Sleeper and Hartley, Inc., Worcester, Mass. [Vol.65,p.694]

The expansible pulley, illustrated, possesses the property of increasing its diameter automatically as the load upon it is increased, thus slowing down the machine of which it is a driven member



in proportion to the amount of work imposed upon it. It is particularly adapted to wire-drawing and similar machinery.

The pulley consists of a disk having a series of pockets inclined at an angle to the radius, a similar disk, in which are an equal number of radial grooves, and eight, or more, rim segments having arms fitted to slide in the radial grooves of the second disk.

Upon each of the arms there is a projecting stud and roller which engages with each of the inclined pockets of the first disk. Forward motion of the pulley causes each roller to travel up the incline of its pocket, with the result that the segments of the rim are moved outward radially and the effective diameter of the pulley is increased.

—319—

Cutting Torch, Oxy-Illuminating Gas, Type I-G

The Alexander Milburn Co., 1416 West Baltimore St., Baltimore, Md. [Vol.65,p.808]

The type I-G oxy-illuminating gas cutting torch can be used with illuminating and by-product gases. Heavy plate and slabs, risers of steel castings, structural shapes, gates, billets and general products of the steel foundry work can be cut with this torch.

The special feature of the torch is a superheater unit

that heats and expands the cutting oxygen, as well as the gases. The temperature of the cutting oxygen is raised to approximately 100 deg. C. prior to combustion.

The high pressure cutting oxygen is controlled by means of a thumb valve, which remains fixed in either open or closed position. The torch is 21 in. in length, and is supplied with a complete range of tips for light, medium and heavy cutting.

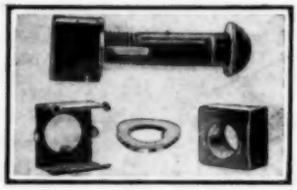
—320—

Lock Nut and Washer

Andrix Lock Nut Co., Locust and Michigan Streets, Adrian, Mich. [Vol.65,p.884]

The lock nut and washer shown in the illustration is for use in machinery, railroad, and bridge construction. The spring washer takes up all stretch or expansion in the bolt, while the lock holds the nut tight.

The washer has a tongue that engages a spline cut in the bolt body. A similar tongue in the locking piece also engages this spline and thus prevents the nut from



turning while four prongs grip the underside of the nut and prevent the lock from falling off.

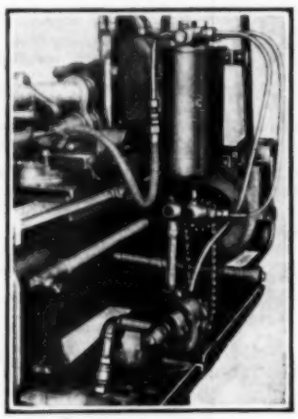
The lock nut is made in both square and hexagon types in four sizes: ¾, 1, 1¼ and 1½ in., to fit standard nuts of the same sizes.

—321—

Filter, Industrial Oil

The AC Spark Plug Co., Flint, Mich. [Vol.65,p.931]

The industrial filter is designed for eliminating grit and dirt from cutting com-



pounds and coolants. The same filter can also be used for handling lubricating oil for bearings.

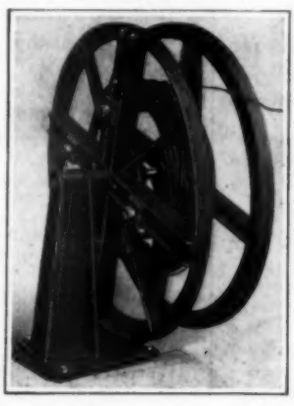
This industrial oil filter is similar to the filter recently developed for use in connection with automobile engines, and the same size refill cartridges can be used in these industrial filters. The filtering capacity is made to suit conditions by using banks of several filters connected in multiple. The filter unit is connected in the high pressure line between the pumps drawing the coolant from the sump and the point of distribution at the tools.

—322—

Wire Reel

Kane & Roach, Syracuse, N. Y. [Vol.65,p.1007]

This wire reel is for use with wire manufacturing equipment and the like.



The reel will handle a coil up to and including 50 in. in diam. It is adjustable in and out with a maximum width of 12 in.

—323—

Benches, Steel Work, "Hallowell"

Standard Pressed Steel Co., Jenkintown, Pa. [Vol.65,p.1086]

The "Hallowell" steel work bench is made of sufficiently heavy gage to withstand abuse.

The benches and tables are

made in three lengths, 3, 6, and 9 ft.; 4 heights, 25, 29, 31½, 33½ in.; and two widths, 29½, 23¾ in. Two weights of top can be obtained, ½-in. heavy steel, or ⅛-in. medium steel.

—324—

Marking Machine, Rapid-Production, No. 21

Noble and Westbrook Manufacturing Co., Hartford, Conn. [Vol.65,p.1086]

The No. 21 rapid-production marking machine shown in the accompanying illustra-

tion is capable of marking short cylindrical parts.

A horizontal revolving dial carries the parts to be marked. These articles are placed on mandrels as shown. The dial revolves and carries the work across the face of the die, which gives the desired mark. The work is unloaded automatically.

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Boring Machines

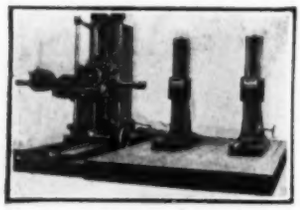
— 1 —

Boring Machine, Horizontal

Kendall & Gent, Manchester, England. [Vol.65,p. 88E]

This horizontal boring machine will deal with floorplate work of all classes. It is capable of taking heavy cuts on work of this type and has a wide range of adjustments and ample speeds and feeds.

At one end of the baseplate are provided square-edged guides on which the box pattern upright has a transverse traverse of 12 ft. Motion can be obtained by hand or power by means of



a rotating nut carried on the stationary screw. The saddle is carried on vertical ways on the upright with means for vertical adjustment through a distance of 4½ ft., and is balanced by a weight inside the column.

The spindle is made of high carbon steel and slides in a sleeve. Three rates of positive self-acting feed are provided, and in addition the spindle has both fine and quick hand traverse.

The machine is driven by a variable speed motor which drives through reduction gearing to a vertical splined shaft. This shaft transmits motion to the gearbox which gives the three self-acting feeds and two rates of spindle speed by gear change.

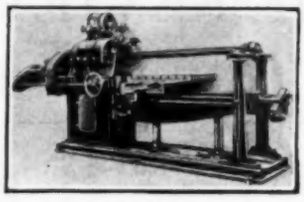
Two adjustable boring bar stays provided on the base will admit bars up to 5 in. in diameter.

— 2 —

Boring and Facing Machine, Horizontal

Oldfield & Schofield Co., Ltd., Booth Town, Halifax, England. [Vol.65,p.162E)

This company has built a motor-driven, all-geared, horizontal boring, facing, drilling and milling machine. The 7½-hp. motor is mounted on the headstock and transmits its power through a Renold



silent chain to the headstock mechanism. The headstock gears provide nine spindle speeds, from 10 to 400 r.p.m. A kneeslide is fitted to the vertical square guideways provided on the cabinet casting, and is steadied at its outer end by stays. The kneeslide has power and hand vertical motion.

Broad guides are provided for the table carriage, the worktable measuring 36x 24 in. The carriage has automatic feed in both longitudinal and transverse directions. Three rates of change and reverse for the boring and milling feed of the table are $\frac{1}{64}$, $\frac{1}{32}$ and $\frac{1}{16}$ in. The longitudinal traverse of the table is 36 in. and the transverse movement 12 in. The boring bar has a longitudinal automatic feed of 30 in. The three drilling feeds are $\frac{1}{64}$, $\frac{1}{32}$ and $\frac{1}{16}$ in., respectively.

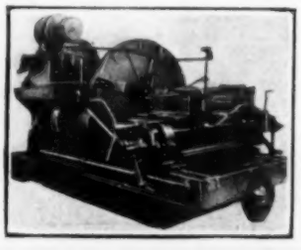
The outer end of the boring bar is supported in a bearing at the top of the vertical stays, which is adjustable along the baseplate. The facing tool will deal with work up to 24 in. in diam., and has a tappet feed. The maximum distance from the table top to the center of the spindle is 24 in., and the minimum 3 inches.

— 3 —

Boring Machine, Car-Tire, Single-Faceplate

Armstrong, Whitworth & Co., Ltd., Openshaw, Manchester, England. [Vol.64,p. 165E]

The car tire boring machine with single faceplate will admit ties up to a maximum diameter of 4½ ft. on the tread, the minimum diameter being 2½ ft. The headstock carries a faceplate



5 ft. in diam., with four jaws for chucking purposes. The drive may be by a 20-hp. variable-speed d.c. motor through reduction gears to a spur ring on the back of the faceplate or by an a.c. constant-speed motor and gearbox.

The cross-bed carries a saddle for boring and proving. It can be moved to and from the faceplate by means of a 3-hp. traverse motor. The cross-bed is run up to dead stocks, a slipping clutch being used. This bed is secured to the bottom bed by a device that locks four bolts simultaneously.

Screws adjust the saddles on the cross-bed for the different diameters of tires to be machined. Dead stops are provided. Each saddle has a large steel ram, bedded and gibbed, the saddle being extended at the back to support the ram inside the tire in order to prevent the possibility of boring taper. The feed to the ram is by shafts and a disk through ratchet motion and gearing. A coarse feed can be used for the boring operations and a fine feed for grooving.

— 4 —

Boring Machine, Locomotive-Cylinder, Four-Spindle

H. W. Kearns & Co., Ltd., Broadheath, England. [Vol. 65,p.116E]

This horizontal machine is capable of boring two locomotive cylinders and two valve chambers simultaneously. Holes can be bored in cylinders from 12 to 30 in. in diam. and in valve chambers from 8 to 16 in. in diam. The minimum and maximum diameters that can be faced by the large bar are 12 and 36 in., respectively, and by the small bar 6 and 20 in. The main bedplate measures 10x12 ft. and is T-slotted. On it are mounted two cross-

beds, carrying uprights with driving headstocks. These are adjustable along the crossbed by hand and the driving headstocks are also adjustable vertically on each upright. Both the smaller driving headstocks can swivel 15 deg. each way in vertical and horizontal planes.

Four boring bars are provided, two 7½ in. in diam. for the main cylinder bores and two 4 in. in diam. for the valve chambers. Four boring stays are also available. The large boring bars have a vertical adjustment of 18 in. and the small bars 24 in. The large bars have a maximum horizontal center distance of 78 in. and a minimum of 22½ in. Corresponding dimensions for the small bars are 78 and 12 in., respectively. The maximum travel of the sleeve bar in all cases is 54 inches.

Drilling Machines

— 5 —

Drilling Machine, Inverted, 5-Spindle

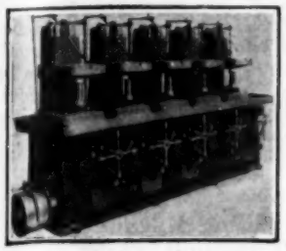
Selson Engineering Co., Ltd., Coventry, England. [Vol.64,p.259E]

In this drilling machine, the relative position of the spindle and the work is reversed from the ordinary design, the work being placed over the drill. The cuttings fall away from the hole produced, so that it is not necessary to withdraw the drills periodically to remove the cuttings and a cleaner cut is said to result.

The machine is made with a varying number of spindles independently operated. The work is bolted direct to the table or to a jig secured on the table and once the spindle is set in motion, the drilling operation is automatic until the table returns to rest in its original position. Each table is fed downwards and by means of an adjustable stop, the feed can be tripped as required. When facing, a slight dwell occurs between the disengagement of the feed and the operation of the quick return to enable the facing cutter to finish the surface. Only one speed and one feed are available for each spindle, set to the requirements of the work.

The main frame is of box section, carrying the driving and feed mechanism for the five spindles. At the top a tray is formed for returning the coolant to the tank and the top also carries the

five uprights with vertical V-guides for the worktables. The drive is by a shaft running the full length of the machine and carrying fast and loose pulleys driven direct from the lineshaft. The spindles are driven independently from the main driving shaft by bevel gear-



ing controlled by a friction clutch. The spindles are bored No. 4 Morse taper.

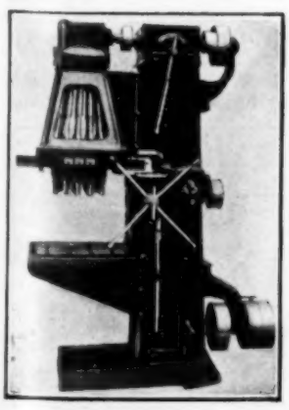
The tables are of right-angle form, adjustable both by hand and power as to height on the uprights and the plane horizontal surfaces are provided with T-slots for securing the work. The feed for each table is by a screw. The quick automatic reverse is driven from a separate shaft. The table measures 12x12 in., the distance from the center of the spindle to the vertical part of the table being 6¼ in. The vertical traverse of each table is 10 in. and the spindles are 1¾ in. in diameter.

—6—

Drilling Machine, Multiple-Spindle

F. Town & Sons, Halifax, England. [Vol.65,p.71E]

The vertical drilling machine shown has 12 spindles and has been specially designed for drilling automobile engine cylinders and other repetition drilling. All the spindles can be set in a circle 16 in. in diam. or 16 in. square, or six spindles can be arranged in a 6 in. circle.



The driving headstock is square and the twelve spindles can be set in two lines varying from 3 to 16 in. apart.

Each spindle is carried in an adjustable slide bolted to the headstock by means of T-slots and each drills holes up to ¾ in. in diam. The spindles can be adjusted a distance of 1¼ in. to accommodate varying lengths of drills. The drives to the spindles are by telescopic universal-jointed shafts. The minimum centers are 2⅜ in. Four spindle speeds are provided, namely, 200, 445, 580 and 750 r.p.m. The machine is belt driven and has a four-speed gear box of the sliding-gear type.

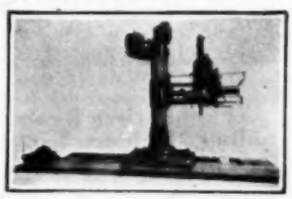
The elevating worktable has a working surface of 2x2 ft. and is balanced by a weight inside the column. Three positive feeds of 100, 150 and 200 cuts per in. of traverse are available. Quick adjustment to the table is provided.

—7—

Drill, Radial, Traversing-Pillar

J. Archdale & Co., Ltd., Birmingham, England. [Vol. 64,p.254E]

This radial is mounted on a traverse bed so that the spindle can be made to cover multiple worktables. The machine itself is this company's 4½-ft. heavy-duty centralized-control radial. All levers for changing the feed and speed and for locking the



saddle and arm are carried on the saddle under the operator's immediate control. Also, one lever locks and unlocks both the saddle and arm, simultaneously.

The spindle has a vertical traverse of 15 in. and a horizontal traverse of 3 ft. 2 in., the vertical adjustment of the arm being 2 ft. 7 in. It admits work 7½ ft. in diam. clear of the column and 5 ft. in diam. clear of the carriage. The traverse of the drill along the bed is 10 ft. at the rate of 100 in. per min. The spindle is capable of drilling holes up to 3 in. in diam. in cast iron.

A 7½-hp. constant speed a.c. motor mounted on the column drives the machine. The motion is transmitted through a nine-speed gearbox and double-gear mechanism on the saddle to the spindle. This has 18 speeds ranging from 27 to 580 r.p.m. The gearbox has heat-treated nickel-chrome gears running on heavy-duty ball bearings. Four power feeds ranging from 32 to 120 cuts per in. are provided, and an automatic stop of dial type facilitates repetition drilling to a predetermined depth in the work.

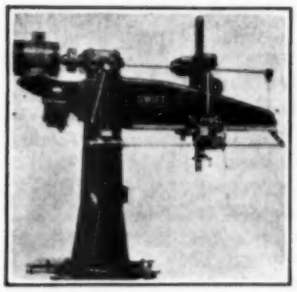
The column is mounted on the traversing slide which may be locked on the base in any position. It is traversed along the base by a screw driven from a separate motor.

—8—

Drill, Radial, Girder, 6-Ft.-3-Inch

G. Swift & Sons, Ltd., Halifax, England. [Vol.65, p.76E]

This motor-driven central-thrust plate and girder radial drilling machine is specially adapted to meet the require-



ments of construction engineers, boilermakers, bridge makers, etc. It has a maximum radius of 6 ft. 3 in. and a minimum radius of 1 ft. 10 inches.

The pillar and base are of large diameter. The radial arm revolves on journal and roller bearings. The saddle is quickly moved by means of a start handle, the traverse along the arm being 4 ft. 5 in. It is locked to the arm simultaneously with the locking of the arm to the pillar.

The high-tensile steel spindle is bored to No. 4 Morse taper and has a vertical feed traverse of 15 in. A compensating spring balance device is provided. Inclosed gears provide two feeds, 60 and 105 rev. per inch.

The drive is by a 7½-hp., constant-speed motor, mounted with the starter on the back of the arm. A four-speed gearbox gives spindle speeds, from 185 to 465 r.p.m.

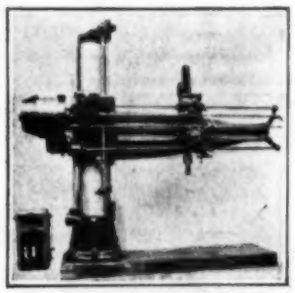
—9—

Drills, Radial, Motor-Driven

W. Asquith, Ltd., Halifax, England. [Vol.65,p.86E]

This company has added to its line of motor-driven radial drills a 6-ft. machine and an 8½-ft. machine.

In the 6-ft. machine a constant-speed motor is carried on the radial arm at the rear and the drive is transmitted through a 9-speed gear box provided with an index dial plate to a double gear on



the saddle, giving 18 spindle speeds from 30 to 450 r.p.m. Four rates of power feed are provided. For rapid repetition drilling of holes of equal depth automatic trip motion complete with an index dial is fitted. The fine hand feed motion to the spindle is controlled by a handwheel, while the rapid vertical traverse is effected by a starwheel on the saddle.

The saddle is carried on the radial arm on rollers and the arm is of tubular section. It is fitted to the cylindrical column upon which it has a vertical power adjustment of 2 ft. 8 in. This machine is designed for drilling holes in steel up to 2 in. in diam. and occasionally up to 3 in. Whitworth threads can be tapped up to 1¼ in. in diam. The minimum working radius is 1 ft. 10., and the height admitted under the spindle nose is 5 ft. 6 in. The base plate has a working surface of 5 ft. 6 in. x 3 ft. 3 in. by 9 in. deep.

In the 8½-ft. machine illustrated, a variable-speed motor is carried on the radial arm at the rear of the column.

The maximum radius of the spindle is 8½ ft. and the minimum radius 2 ft. The height admitted under the spindle nose is 7 ft. 3 in. The arm has a vertical power traverse of 3 ft. 8½ in. The travel of the spindle, both by hand power, is 1½ ft. The baseplate has a working surface of 8 ft. 2 in. x 3 ft. 5 inches.

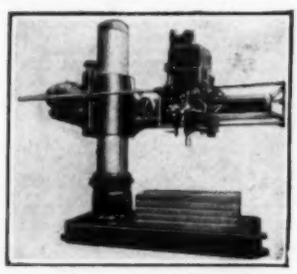
— 10 —

Drills, Radial, Motor-Driven, 7-Foot

Alfred Herbert, Ltd., Coventry, England. [Vol.65,p. 136E]

This 7-ft. radial drill has a driving motor carried on the arm where it acts as a counter-weight. It will drill holes up to 3⅛ in. in diameter in steel, and will tap holes in cast iron up to 2 in. or 1⅛ in. in steel.

The maximum and minimum distances from the spindle to the baseplate are 6 ft. 6 in. and 14 in. respectively. The vertical traverse of the arm on the column is



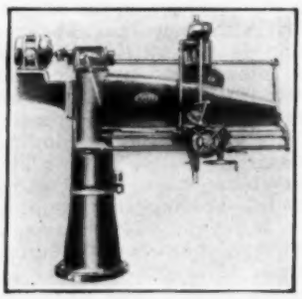
3 ft. 10 in. and the movement of the saddle on the arm is 4 ft. 10 in. The traverse to the spindle is 18 in. The baseplates measure 6 ft. 6 in. by 4 ft. 3 in. on the working surface. The arm is carried on a sleeve which rotates on a column, the weight being taken on ball bearings at the top. The arm is of pipe section and the raising and lowering motion is obtained from a stationary screw and rotating nut, which is driven through a clutch engaged by the action of unclamping the arm. Safety devices are provided at the top and bottom of the vertical movement. All speed and feed changes are made on the saddle and it is clamped to the arm and the sleeve on the column simultaneously by one hand lever. The spindle has 16 speeds, ranging from 24 to 491 r.p.m., the changings being provided by sliding gears doubled by back gears. Six positive feeds ranging from 28 to 126 cuts per in. can be obtained on the machine.

— 11 —

Drill, Radial, Central-Thrust, Girder, 6-Foot

Kitchen & Wade, Halifax, England. [Vol.65,p.183E]

The drive to this radial is by means of a 10-hp. constant-speed motor mounted



on a bracket, coupled direct to a four-speed gear box giving spindle speeds ranging from 400 to 133 r.p.m. Motion is transmitted from the gear box along the horizontal driving shaft to phosphor-bronze and hardened steel spiral gears on the side, mounted on ball bearings.

The steel spindle runs in a hard steel sleeve on which the feed rack is cut. Four positive feeds are provided, ranging from 43 to 150 cuts per in. The feed changes are effected while the machine is running.

The maximum radius available is 6 ft. 1 in., the minimum radius 23 in., the maximum distance from spindle nose to floor is 4 ft. 3 in., and the length of the spindle feed is 18 inches.

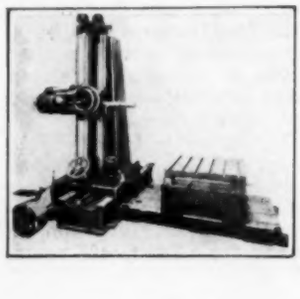
— 12 —

Drilling Machine, Horizontal, Improved

Kitchen & Wade, Halifax, England. [Vol.65,p.101E]

This horizontal drilling machine was built for machining marine engines and pumps. Both the horizontal traverse of the column along the bed and the vertical traverse of the saddle on the column is 5 ft. The main bed has a baseplate bolted at right angles to it. It has the usual T-slots and measures 6 ft. 2 in. x 3 ft. 4 in. On it a removable squaring worktable, 3 ft. square, is fitted with stops for each 90 degrees.

The feed box gives four power feeds. The drilling spindle is bored No. 5 Morse taper and has a horizontal feed of 15 in. Eight spindle speeds varying from 22 to 350 r.p.m. are available through the four-speed gear



box and double gears on the saddle. Both fine and quick hand adjustments are also furnished, together with a reverse motion for tapping and studding, back facing and boring.

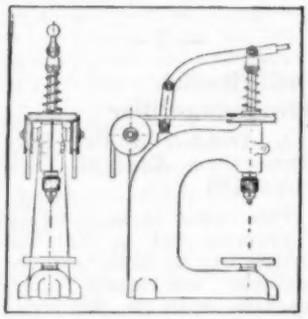
The drive is by a fast and loose pulley. All shafts and driving gears are made of high-tensile carbon steel and all bearings are bushed with bronze. The machine will drill holes 2⅛ in. in diam. in mild steel and will bore holes up to 10 in. in diam. The maximum height of the spindle nose is 7 ft. 3 in. from the floor.

— 13 —

Drilling Machine, Bench, Small

C. A. V. Small Tools, Ltd., Portland Road, Portslade, Brighton, England. [Vol. 65,p.26E]

This small bench drilling machine of simplified construction has a drilling ca-



pacity of ¼ in. and a vertical movement of the spindle of 2¾ in. The throat capacity is 5 in.; the drill table is 3¾ in. in diam., and the overall height is 19¼ inches.

The feed of the spindle is effected by an overhead lever, counterbalanced by a compression spring. The machine may be arranged for belt drive or for treadle drive. When power drive is available, foot control may be utilized for the spindle feed. The worktable is slotted for handling small work.

— 14 —

Drilling Machines, Horizontal, Light, Special Purpose

F. Pollard & Co., Ltd., Leister, England. [Vol.65,p. 8E]

In addition to its line of high-speed radial drills and vertical drilling machines, this company is also manufacturing a line of horizontal drills in single and multiple spindles.

The two-spindle machines are intended for drilling work on two sides simultaneously, and the horizontal machines are generally for work of irregular shape that cannot be placed conveniently under a vertical spindle. Standard models of this type are made, but most of them are for single and special purposes. The drive is by belt.

Grinding Machines

— 15 —

Grinding Machine, Tap, Semi-Automatic

Dowding Machine Tool Co., Ltd., Bush House, Aldwych, London, W.C., England. [Vol. 64,p.232E]

This machine has been developed for grinding the relief on the taper leaf of taps. The output of the machine is said to be between 40 and 60 taps per hour, depending upon their size. Taps are held by the squares in the two-jaw chuck and supported by the center in the tailstock. The machine imparts to the tap a simultaneous axial and rotary movement, which, combined with the angle at which the tap is set, produces the desired relief.

The drive is by means of a belt from a drum on an overhead countershaft to the single pulley. Various changes of speed are available. The grinding wheel head has cross adjustment by means of a handwheel in front of the machine. The main worktable is traversed by a handwheel and is guided on V's at the front and a flat ways at the rear.

The swivelling top table may be set to any angle from

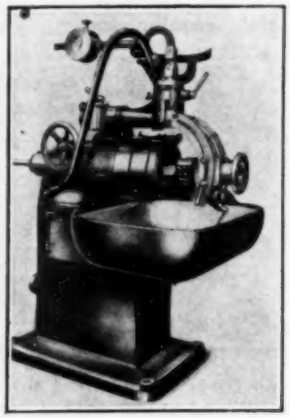
0 to 30 deg. and the machine grinds taps from $\frac{3}{16}$ to 2 in. in diam. The longest tap admitted is 15¼ in. The axial stroke of the work spindle can be varied from 0 to $\frac{5}{8}$ in. The relief obtained with a full stroke at an angle of 25 deg. is $\frac{11}{64}$ inch.

— 16 —

Grinding Machine, Tool

Coats Machine Tool Co., Ltd., Palmer St., London, S. W., England. [Vol.65,p. 185E]

The machine is built in three sizes suitable, respectively, for tool-steel sections up to $\frac{3}{4}$, 1 and 2 in. square. The drive is usually by belt from a lineshaft with a ball



bearing countershaft built into the machine. If desired direct motor drive may be obtained.

The grinding spindle runs at about 2,000 r.p.m. and is carried in ball bearings mounted in dust-proof housing. The wheel itself is fully protected from grit, etc.

The tool is carried in a chuck and either short or long tools can be ground. The toolholder can be adjusted to any desired angle in the vertical and horizontal planes by means of graduated motions, the adjustment in each case being about 180 deg. For one plane the movement is obtained by swivelling around a vertical pin; in the other the adjustment is by means of a sector.

— 17 —

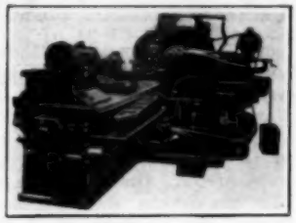
Grinding Machines, Roll

Churchill Machine Tool Co., Ltd., Broadheath, Manchester, England. [Vol.64,p. 176E]

This company has adapted its standard plain type grinding machine for grinding rolls and has also built a special machine for this purpose.

The plain grinder takes 84-in. rolls between centers and has a self-contained electric drive.

A special cambering mechanism is furnished. It con-



sists of a straight bar swiveled at its center, according to the inclination required by the camber to be produced. A long slider also swiveled on a central pivot is connected to one end of the top of the table. It is in contact with the inclined bar thus causing the table to swivel as desired. The cambering mechanism can be instantly disengaged for parallel grinding.

The table is carried on two V-slides and is lubricated by oil rollers. The main shaft at the rear is direct coupled to a motor and from this shaft all motions are obtained. The wheelspindle is driven by belt. Open and crossed belts are used to drive the table, through a three-speed gearbox and reduction gearing to a screw in the center of the bed. Hand motion is also provided for close positioning.

The roll is carried between centers when grinding journals and is supported on journal rests when the body is being ground. Both the workhead and tailstock are adjustable along the table.

Interchangeable three-step cone pulleys give six speeds to the faceplate and the table travel is controlled by adjustable dogs.

— 18 —

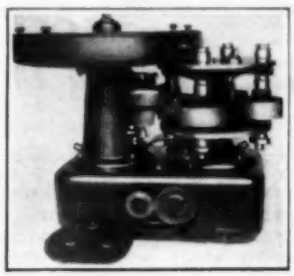
Grinding Machine, Surface, Special-Purpose

Schaublin-Villeneuve, Malleray, Switzerland. [Vol.64, p.191E]

This machine is for grinding and polishing small disks, gears and plates used in the watch, clock and instrument trades. The machine has a capacity for disks up to 2 in. in diam. and maximum thickness of about $\frac{1}{16}$ in. The pieces to be ground are carried on rotating vertical spindles which are passed underneath the abrasive wheel.

The machine consists essentially of three parts, namely, the grinding wheel head, revolving work head carrying four spindles and a gear box forming the base. The grinding wheel is 16 in. in diam. and rotates at 1,320 r.p.m. on a vertical spindle supported in conical roller bearings.

The plates to be grounded are placed in holders at the top of the spindles. The work spindles are rotated only while they are under the abrasive wheel, being



driven by means of a cross belt. As the spindles come under the abrasive wheels they are raised by a cam of adjustable height. Rotation ceases when the spindle leaves the grinding wheel.

The thickness of the work to be ground is set by means of screw at the bottom of each spindle. The gearing runs inclosed in an oil bath.

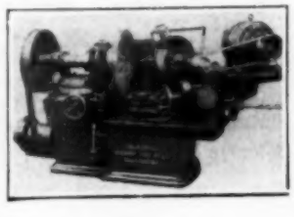
— 19 —

Grinding Machine, Spherical, External and Internal

Churchill Machine Tool Co., Ltd., Broadheath, Manchester, England. [Vol.64,p. 255E]

The spherical surface grinder has been designed for use in the manufacture of radial and thrust ball bearings and other types of spherical surfaces. It consists essentially of a rotating workhead together with a grinding head which has an automatic oscillating motion about a fixed point. The machine has both an external and an internal grinding head.

The workhead carries a large faceplate and is belt driven. The driven pulley receives its motion through reduction gearing from a



three-step cone pulley so that three speeds are provided. The workhead is carried on a slide and is adjustable.

The grinding wheel head is mounted on a long slide provided with T-slots for clamping purposes.

The wheelhead slide has independent adjustment on the oscillating slide which has motion through an angle of 35 deg. effected by a disk and crank mechanism at the rear of the machine. The drive to this motion is also by a three-step cone pulley.

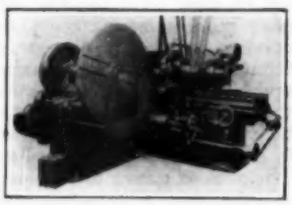
— 20 —

Grinding Machine, Ball-Race, Universal

Churchill Machine Tool Co., Ltd., Broadheath, Manchester, England. [Vol.65,p. 87E]

The large universal grinding machine is for the grinding of large races of ball bearing. The work is attached to the faceplate which is 42 in. in diam. and, is therefore, confined to pieces of disk form.

The grinding-wheel headstock is mounted on a long slide and is similar in construction to that used on the Churchill heavy universal grinding machine. It carries



two spindles and is mounted on a swivel base so that the heads carrying the external and internal grinding wheels are always in position. With this construction resetting is unnecessary since external and internal concentricity is insured.

Dogs which operate the reversing mechanism of the wheelhead slide control the length of stroke of the automatic traverse. It also may be operated by hand.

— 21 —

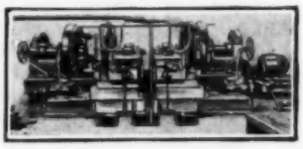
Grinding Machine, Wheel, Railway

Armstrong, Whitworth & Co., Ltd., Manchester, England. [Vol.65,p.163E]

This railway wheel grinding machine consists of two independent grinding heads fixed on a common base attached to the back of the machine in which the wheels are revolved. The grinding wheels used are 28 in. in

diam. with a 3-in. face, and they run at approximately 5,500 ft. per min. Each head is driven by a separate 30-hp. motor.

The slide carrying the grinding spindle is arranged to feed at right angles to the bed of the machine. The feed is regulated by means of gearing through a worm and wormwheel, and any backlash in the feed is taken up by means of a weight attached to this slide. The feed is added by means of a dial



graduated to 0.005 in. Quick traverse of this slide is obtained by fitting a handle on the spindle carrying the large bevel gear and operating the worm direct. The feed gears of both heads can be interconnected.

Lathes

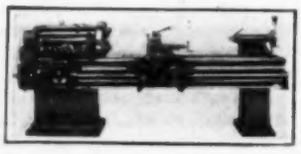
— 22 —

Lathe, Center, 8-Inch

Machine Tool Works, Oerlikon, Switzerland. [Vol.64, p.164E]

In this 8-in. center lathe the swing works 16¼ in. in diameter over the bed and 10¼ in. over the carriage and 22¼ in. in diameter over the gap. The bed is made in three lengths to admit work 39¼, 59 in., and 78¾ in. between centers. A single pulley is used to drive the all-gear head in which the main driving gear is placed in front of the main bearing and directly on the nose of the spindle so that at the heaviest cut the spindle itself is entirely free from torsion. The sets of gears in the head are in simple combinations, giving 16 speeds, forward and reverse, in geometric progression.

For screw-cutting an improved gearbox ix provided.



With two supplementary gears it is possible to obtain 42 metric, 42 Whitworth and 28 module threads.

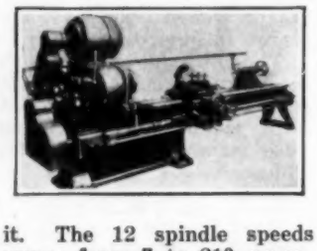
The bed is stiffened by zigzag braces and has two separate prismatic guides for the carriage and head.

— 23 —

Lathe, Center, All-Geared, 11-Inch

C. Redman & Sons, Ltd., Halifax, England. [Vol.64, p.178E]

This 11-in. centre lathe has an all-geared head and is motor driven. A 6-hp. motor, running at 800 r.p.m., drives through a raw-hide pinion and spur gears to the drive shaft which is fitted with a friction clutch. The reverse motion is operated by means of a one-tooth clutch. The spindle has a hole 2¼ in. in diam. through



it. The 12 spindle speeds range from 7 to 210 r.p.m., and can be controlled by three handles.

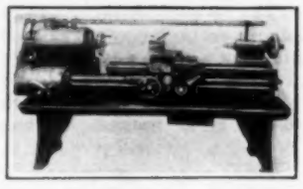
The bed is of the box-end gap-section type, 12 ft. long, and is 16 in. wide across the shears. The lathe admits work 7 ft. 2 in. long between the centres, and swings work 16¼ in. diam. over the saddle, and 39x13¾ in. wide in the gap, or 41¼ in. when the screw is removed. The swivelling slide rest is indexed for conical turning and the apron forms a double-walled gear case. The screw-cutting and feed motions are interlocked and can be changed without stopping the lathe.

— 24 —

Lathe, Center, Geared-Head, 6½-Inch

Selson Engineering Co., Ltd., Coventry, England. [Vol.64,p.226E]

The drive of this 6½ in. center lathe with all-geared head may be by friction clutch or fast and loose pulleys. By means of two sets of sliding gears eight spindle speeds are obtained, ranging



from 17 to 335 r.p.m. Otherwise the machine is standard, swinging work 13¾ in. in diam. over the bed, or 8 in. over the carriage, and 20 in. in the gap, which is 7¼ in. wide from the face-plate. The maximum distance between the centers is 3 ft. 3 in.

The spindle is bored with a 1 5/16 in. hole. By means of a quick-change gearbox 28 threads can be obtained, ranging from 2 to 28 per in. The gearbox forms a complete unit and tumbler notches ensure accurate engagement of the gears. If preferred, a box providing three feeds can be furnished.

The surfacing screw of the carriage cross-slide has collar graduated to 0.001 inch.

— 25 —

Lathe, Center, All-Geared, 10½-Inch

G. Swift & Sons, Ltd., Halifax, England. [Vol.65, p.22E]

This 10½-in. all-geared head center lathe will take work up to 7 ft. 3 in. long between the centers, 16 in. diam. over the saddle and 34 in. diam. in the gap. The box-section bed, 12 ft. long, is more rigid than usual. A 7½-hp. motor mounted on the foundation baseplate drives by silent chain.

The hole through the spindle admits bars 3¼ in. in

diam., and 16 spindle speeds ranging from 11 to 300 r.p.m. are available. The loose headstock has the usual adjustments for taper turning.

The saddle has a bearing on the bed eight times the width of the guide. The sliding and surfacing motions are controlled by a stud on the apron. The feed shaft has a safety slipping device, and is geared up independently of the leading screw.

A gearbox provides four positive feeds, varying from 24 to 96 cuts per in. If required, a box giving 12 to 48 cuts per in. can be substituted. The reversing motion for cutting right- and left-hand threads and for sliding and surfacing can be changed while the lathe is running. A screw-cutting dial is fitted on the saddle. Forty different threads can be cut with ten changes of gears.

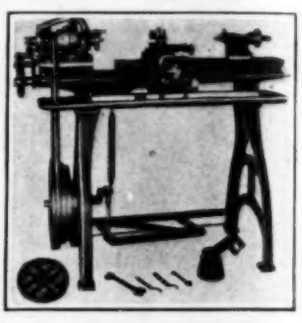
— 26 —

Lathe, Center, 4⅛-Inch

Henry Milnes, Ingleby Works, Bradford, England. [Vol.65,p.127E]

This 4¼ in. center lathe with a gap bed 4 ft. long will take work 2 ft. 5 in. between centers. The swing is 5¼ in. over the boring table, and 12 in. x 3¼ in. wide in the gap.

The headstock with overarm and tailstock and this firm's regular design. The



spindle is driven by a three-step cone pulley with a back gear of 5 to 1. The spindle runs on roller or plain bearings, as desired, and a ball thrust washer is provided.

The carriage provides a boring table, and the slide-rest can be adjusted to any angle by means of a circular T-slot. For moving the carriage by hand the lead screw nut is revolved on the screw, but for screw-cutting it is held stationary. The nut is consequently always engaged in the same position relative to the apron. The sliding or screw-cutting motion can be stopped at any desired point.

The lathe can be supplied for bench use or with a floor stand. The drive is by treadle, countershaft, or direct-coupled electric motor.

— 27 —

Lathe, Surfacing and Screw Cutting, 6-Foot

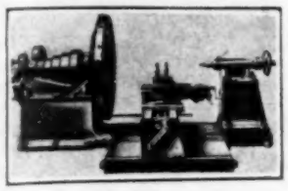
Scott Bros., Ltd., Halifax, England. [Vol.65,p.147E]

This lathe is for surfacing and boring work up to 6 ft. in diam. by 3 ft. wide and for screw cutting up to 16 in. in length.

The driving headstock, which bears a four-speed cone pulley, has treble gears

The surfacing bed is mounted on an extension baseplate, and is adjustable to and from the faceplate to suit different thicknesses of work. The compound swiveling slide-rest has automatic feeds for the surfacing and boring operations.

For the screw cutting motion, the swing plate for the change wheels is mounted off the end of the box-end bed.



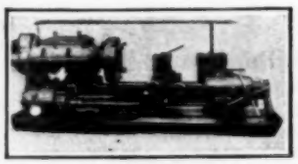
From this point a shaft connects to the cross bed and the swivel-rest screw. The traverse for screw-cutting is engaged by means of a dog clutch. The rest carries a dial indicator for engaging the proper thread. The reverse plate is on the driving headstock.

— 28 —

Lathe, Turret, Combination, 24-Inch

Dean, Smith & Grace, Ltd., Keighley, England. [Vol.65, p. 113E]

The 24 in. all-geared, single-pulley head, combination turret lathe is adapted for general chucking work or for bar work up to 5¼ in. diam. The bed is 9 ft. long, 16 in. wide across the shears,



by 19½ in. deep under the driving head, with square edges and narrow guide.

The headstock provides sixteen spindle speeds, ranging from 9.9 to 180 r.p.m. The high-speed shafts run in ball bearings. The four-jawed independent chuck is 24 in. diam., and a screw bell-chuck is also used at the rear of the spindle in conjunction with the main chuck.

The surfacing slide carries a square turret at the front and a tool-post at the rear. Four adjustable stops are provided for the surfacing and sliding motions. The hexagon turret has longitudinal feed only, and is rotated by hand. For automatic operation a tripping dog in used.

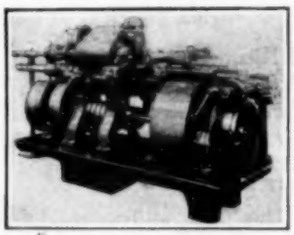
The feed shaft drive is taken first through a four-speed gearbox and then through a supplementary two-speed box. A slipping clutch is included. The eight longitudinal feeds on the chasing saddle range from 120 to 12 cuts per inch, and both the cross traverse and the hexagon turret feeds vary from 240 to 24 cuts. The maximum distance from chuck to turret face is 3 ft. 4¾ in., and the minimum distance is 16¼ inches.

— 29 —

Screw Machine, Automatic, 1½-Inch

Armstrong, Whitworth & Co., Ltd., Openshaw, Manchester, England. [Vol.64,p. 240E]

This 1½-in. small-piece automatic screw machine will take round bars up to 1¾ in. in diam., hexagon bars 1.48 in. across the flats and square



bars up to 1⅝ in., the maximum length turned being 6 in. The maximum thread turned with the standard die-head is a 1 in. Whitworth or gas thread.

Single-pulley machines are readily adaptable as chucking machines or as second-operation machines. For the bar feed a feed tube and pusher collet behind the main collet are used. The cross-slides are independent and have fine adjustment and dead-stop screws, while tool-posts can be supplied to take tools of any type. The turret is maintained in vertical alignment by a ball thrust race of a large diameter. The camshaft, which is below the bed, directly controls all movements. The driving mechanism provides high-speed withdrawal and indexing of turret and a slow speed for turning, controlled by trip dogs.

The headstock is of the totally-inclosed, all-geared type, providing 18 spindle speds in six groups of three, the three speeds in each group being selected automatically and the group changes being effected by change gears.

The faces of the turret are 5x3 in. with a 1½-in. hole. The height of tool holes over the turret slide is 2½ in. The minimum distance from the turret face to the collet is 9 in. Tools 1 in. square can be used on the cross-slide.

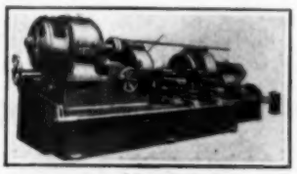
— 30 —

Lathe, Car-Wheel, Railway

Campbells & Hunter, Ltd., Leeds, England. [Vol.64,p. 205E]

This railway car-wheel lathe is capable of turning a pair of railway car wheels 3 ft. 7 in. in diam. on their axles in 17 min., floor to floor time. Wheels up to 4 ft. in diam. can be machined in this lathe, which admits axles up to 9 ft. 6 in. long between centers.

The bed is cast in one piece, and has sides and bars of



box girder section. One headstock is fixed; the other is movable along the bed in either direction by means of an auxiliary motor. The spindles run in gunmetal parallel bearings and the end thrust is taken on a heavy ball thrust bearing. Each spindle is bored to receive a large sliding ram.

The lathe is driven by a 50-hp. variable-speed motor, mounted on the fixed headstock. The two series of spindle speeds provide a range from 0.5 to 1.5, and from 1.55 to 4.65 r.p.m. respectively.

Two saddles are provided, each fitted with a four-sided forged-steel tool turret, which can be swiveled to suit the angle of the tread and to turn both the tread and the sides of the wheel in one setting. The reversible ratchet feed motion gives feeds ranging from ¼ to 1/20 in. across the tire tread.

— 31 —

Lathe, Locomotive-Wheel, Heavy

J. Buckton & Co., Ltd., Leeds, England. [Vol.65,p. 134E]

The heavy locomotive wheel lathe will turn wheels from 3 ft. to 5 ft. 8 in. in diam. on the tread, with either inside or outside journals, and with or without crankpins. The outside journals are centered by means of cone grips held in the coned ends of the sliding spindles, and these spindles are also provided with solid cones fitted with steel centers for taking wheels with inside journals. The height of centers from the front shear is 33 in., and from the back shear 36 in., the length admitted between centers being 9 ft. 9 in.

The machine carries fixed and adjustable headstocks

with 6 ft. faceplates driven in unison. The drive is by a 50-hp. variable-speed motor and two-speed gear box. Full automatic electrical control gear is provided.

Recesses are provided in the faceplates to receive outside crankpins, thereby reducing overhang and obtaining increased rigidity. Four drivers provided to each faceplate permit the sides of tires to be machined by the back rests simultaneously with the turning of the treads by the front rests. The right-hand headstock is adjustable along the bed.

Longitudinal hand and power feeds and transverse hand feeds are provided. The top slides have transverse hand and power feeds, with additional knock-off. The transverse feeds are independently driven from the bed shaft. The floor space occupied is 28 ft. by 11 ft. 4 in., and the weight of the machine, exclusive of the two motors, is 40 tons.

— 32 —

Lathe, Finishing, Worm-Thread

Ward, Haggas & Smith, Keighley, England. [Vol.65, p.125E]

The special worm-thread finishing lathe is a single-purpose machine, its whole duty being to finish-off the ends of worm threads left ragged and knife-edged by the thread-cutting tool.

A two-speed cone pulley 12 in. diam. by 2½ in. face drives through worm gearing direct to the spindle. The driving head is cast in one piece with the bed, and the headstock spindle runs in phosphor-bronze bearings. The spindle nose is bored to No. 5 Morse taper, and has a hole right through to facili-

tate the withdrawal of the work arbor. The stroke is altered within the limits of the machine by means of a pivoted slotted plate at the rear of the saddle, a constant cam lift being used.

— 33 —

Lathe, Wheel, Railway, 4-Foot

J. Hetherington & Sons, Ltd., Manchester, England. [Vol.65,p.6E]

This lathe is suitable for turning and profiling a pair of wheels mounted on an axle without torsional strain. It handles wheels up to 4 ft. in diameter.

The main drive is by a 50 hp. a.c. motor mounted on a gearbox. This gives six faceplate speeds varying from 0.6 to 2.8 r.p.m. The gearbox is mounted on an extension to the bed. The

gears are of steel and run in oil. The main driving shaft, which passes through the bed, carries a pinion near each end, which drives the internal gear on the faceplate through a train. Each headstock has a hollow spindle running in gunmetal-capped bearings. The axles may be supported at the journals using split cone bushes, or they may be carried on ordinary centers.

Four wedge drivers are used on each faceplate, and each spindle has a large diameter ball thrust bearing to take the end pressure on the faceplates. The faceplates can be adjusted relative to one another.

The compound slide-rests, arranged to swivel for turning the cone of the wheels, have independent longitudinal hand and power feed, also hand cross-traverse feed. The pillars of the rests are bolted directly to the bed and are adjustable along the bed.

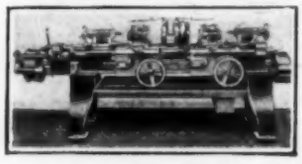
A lifting beam is situated over the center of the lathe; one end is fixed to a standard carried off the fixed headstock and the other end rests on a roller support carried from the movable headstock. The lifting gear is an air-motor hoist mounted on a trolley running on the girder. This lathe is made in sizes for wheels varying from 48 to 90 in. in diam., and for gages up to 5 ft. 6 inches.

— 34 —

Lathe, Central-Drive, Axle-Turning

Armstrong, Whitworth & Co., Ltd., Openshaw, Manchester, England. [Vol.65,p.182E]

This lathe, of central-drive type, is for turning motor-car back-axle shafts. The tools are grouped so that the time for the whole operation is that required for the longest single cut. The machine



swings work 12 in. in diam. over the bed, the maximum distance between centers being 30 inches.

The drive is by single pulley, through a three-speed gearbox giving speeds of 170, 208 and 250 r.p.m., respectively. The gears are hardened and the shafts are mounted on ball bearings.

The driving chuck is of the floating type, the drive being through two slotted plates which allow movement in any direction. The axle is secured for driving purposes by tightening down a jaw on the axle.

The saddle aprons provide double supports for all the shafts. The drive is by worm and wormwheel operating a pinion which gears with a rack in the bed. The feed is controlled automatically by stops, three rates being provided, namely, 50, 65 and 80 cuts per in. The one-piece toolslide supports both front and back tool blocks, which are interchangeable.

Taper turning is effected by means of a sliding toolholder operated at each end of the machine by means of an adjustable tangent bar. Swing over stops with adjustable screws position the rests for forming operations

— 35 —

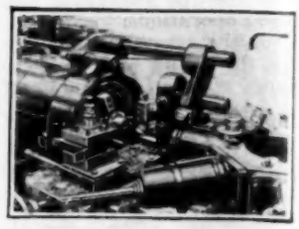
Tool Supports, Overhead, for Combination Turret Lathes

Alfred Herbert, Ltd., Coventry, England. [Vol.65,p.99E]

Overhead supports for tools are being supplied for use with the Nos. 3, 9 and 20 combination turret lathes made by this firm. The supports are similar for the three sizes of lathe.

A bracket is placed at the top of the headstock, and carries a bar that projects parallel with the lathe spindle. The knee turning tools have supporting bushes in line with the supporting bar, along which they slide during the cutting operation.

Tools may be supplied with the supporting bush incorporated in the design, or a special bush bracket can be bolted to the standard tool. For lathes with pump and



cutter cooling systems, the chuck guard form is altered. The front part is of aluminium and hinged so as to swing out of the way when a chuck wrench is being used.

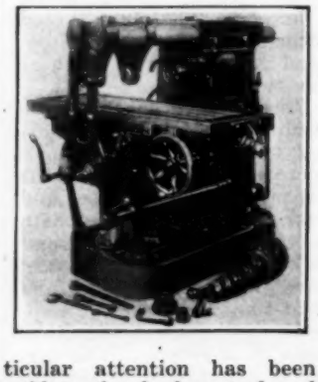
Milling Machines

— 36 —

Milling Machine, Plain, Production, Twin-Overarm

J. Parkinson & Son, Shipley, England. [Vol.64,p.204E]

This plain milling machine was specially designed for high production work. Par-



ticular attention has been paid to the feed control and to the rigidity of the machine.

The machine table has a working surface of 60x20 in. with a longitudinal movement, both by hand and power, of 32 in. and a cross movement, by hand only, of 5 in. The maximum distance from the center of the spindle to the top of the table is 12 in. The table movements are controlled by a single lever on the saddle. The rate of the automatic feed is determined by change gears.

The machine has twin-overarms. The knee is supported at its outer end by a tubular pillar to which it may be locked. Rigidity has been fairly increased by the proportions of the knee, together with the table and the slide, the knee brackets being unusually large. As with the saddle and table, wide bearing surfaces are used with the knee. The spindle nose is bored No. 14 B. & S. taper, and the twin overarms are each 4½ in. in diam., the largest cutters admitted being 15 in. diameter.

The machine is arranged with single-pulley drive, and the final drive is by double-helical gears.

— 37 —

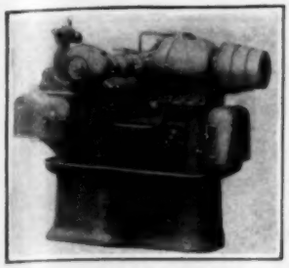
Milling Machines, Worm

Dowding & Dickinson, Windsor House, Victoria Street, London, S. W., England. [Vol.65,p.48E]

The improved Pfauter automatic worm and thread milling machine has a rotating disk cutter and traveling work, different forms of thread being easily accommodated. It is driven by a single belt, the motion being transmitted through gearing to the units.

The cutter spindle is set at 10 deg. to the axis of the work. It may also be swiveled in an opposite plane, the bevel pinion rolling round the driving bevel gear. This movement enables the cutter to be set to the angle required by the lead to be cut. For right-hand helices the range of adjustment may be made up to 45 deg. The cutter may be adjusted axially.

The speed of rotation of



the work, or the feed per revolution of the cutter, is determined by the diameter and material of the worm to be cut, and is obtained by mounting the required gears on a quadrant enclosed by a swinging guard. The final drive is through worm and wormwheel carried in the headstock. Also connected to the wormshaft is the indexing head for multiple-thread cutting. Machines are built in three sizes, to cut worms in diameter from 0 to 17¾ in. by 78¾ in. long, the maximum pitch at one cut in the largest machine being 3⅜ in., although greater pitches are possible by taking more than one cut. The range of leads is up to 20 in. as standard. The largest machine weighs 7 tons.

— 38 —

Milling Cutters, High-Production

S. G. Jones, Ltd., Brixton Road, Kennington, London, S. W., England. [Vol.64,p. 244E]

This company is marketing an inserted-tooth milling cutter made by P. Huré & Co., 218 Rue Lafayette, Paris, France. It has a body of hard steel of conical form, carrying a series of high-speed steel tools all equally inclined, and individually secured. The body is mounted on a shank with taper driv-

ing end, and a screw at the other end secures the cutter body. In order to prevent turning on the shank end the cutter body is mortised to take two driving tenons on the shank itself.

Milling cutters of this type are available in three standard sizes.

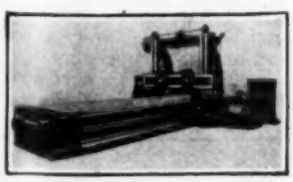
Planers

— 39 —

Planer, Motor-Driven, with Former

Butler Machine Tool Co., Ltd., Halifax, England. [Vol. 64,p.214E]

The electrically - driven planer will plane work 18 ft. long by 5 ft. wide by 5 ft. high. It has two toolboxes on the cross-slide and one side toolbox on the front upright. The front toolbox on the cross-slide is also arranged to carry a runner fitted with Hoffmann roller



bearings, to roll along a curved former plate for radii of from 20 to 60 ft. on work up to 30 in. diam. The former plate is reversible so as to be concave or convex.

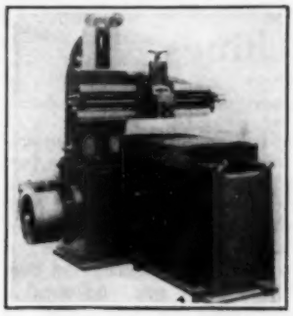
To facilitate the machining of the ends or bases of pieces too wide to pass through the standards of the machine a separate side standard is mounted on cast-iron beds, which are attached to planed seatings and tee slots, 11 ft. long, on each side of the main bed. With the reversing motor drive the cutting speeds range from 17.5 ft. to 70 ft. per min., and the return speeds from 90 ft. to 140 ft. per min. An auxiliary motor of 4 hp. operates the quick power traverse and elevates the cross-slide. Without the electrical equipment the machine weighs 26¼ tons.

— 40 —

Planer, Open-Side, Crank-Type

The White Machine Tool Co., Ltd., Halifax, England. [Vol.64,p.241E]

The open-side crank-driven planing machine is for work 4 ft. long by 2 ft. wide by 1 ft. 6 in. high. The bed is of box section with a projection on which is mounted the standard for the cross slide. The tool can be operated from either side of the machine. The drive is from the lineshaft to tight and loose pulleys, and thence through a



six-speed oil-tight gearbox to the link motion, giving from 5.8 to 58.2 strokes per min. The stroke can be varied from 2 in. to 24 inches.

Gib plates, bedding under the square shears of the bed, prevent the table lifting when planing high work with heavy side cutting. The cross-slide balance weight is placed inside the housing to prevent accidents to the operator.

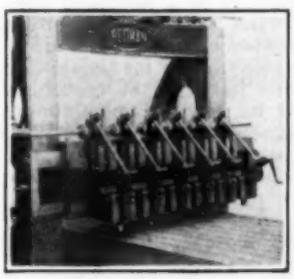
The toolbox has both hand and power reversible feeds, in horizontal, vertical and angular directions. The upward thrust of the cut is taken on a solid lip in the clapper box, thus removing all strain from the hinge pin. The machine is started or stopped by a handle on the operating side of the machine and the operator can stop the table instantaneously at any desired position. The machine weighs 3½ tons and occupies a floor space of 11 ft. by 5 ft. 9 inches.

— 41 —

Tool Holder, Planer, Double-Cutting

C. Redman & Sons, Ltd., Halifax, England. [Vol.64, p.190E]

The Redman-Binns double-cutting tool box is applied to a planing machine weighing about 13 tons, to plane 15 ft. long by 4 ft. 9 in. wide by 3 ft. 6 in. high. The vee ways



have self-oiling rollers, and the worktable is braced its full length with cross ribs to prevent spring. The drive is by two wide belts. A sensitive power elevating motion adjusts the cross-slide.

The six double-cutting toolboxes are mounted so as to move all six toolboxes simultaneously. The toolboxes can be adjusted 9 in. vertically. A radius bearing in the toolbox tends to throw the pressure to the slides, avoiding any tendency to pull the slides apart. Thus the tools, it is claimed, cut accurately, both on the forward and back strokes.

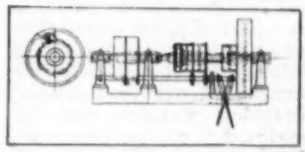
The feed motion for applying the cut at each end of the stroke consists of a pair of ratchet wheels actuated by rack from an adjustable feed dial in the usual way. The tilting motion is operated by means of an adjustable vertical shaft, fed by a friction dial located at the back of the machine. All the toolboxes are set to give the same angle of movement.

— 42 —

Countershaft, Planer, Two-Speed

White Machine Tool Co., Ltd., Halifax, England. [Vol. 65,p.60E]

This two-speed countershaft has been developed for driving planers. The following advantages are claimed. It gives two cutting speeds and a constant return speed,



all of which can be changed while the machine is running. It has mechanical control from the table dogs, and it is possible to arrange for speeding-up over gaps, or alternately slowing down on particularly hard spots.

The shaft is carried in three ring-oiled bearings mounted on a cross-bridge resting on top of the planer housings. At the left-hand end a loose pulley and a fast pulley run at 300 r.p.m., and in the center fast and loose pulleys are mounted, running at 500 r.p.m. They are keyed to a long cast-iron sleeve, the other end of which is keyed to the cutting pulley. The return or reverse pulley is keyed to the shaft, and runs at a constant speed of 300 r.p.m. A pawlwheel mechanism is incorporated in the middle pulley, and it acts as a slip clutch when the higher speed is used. At the rear is the belt-shifting gear which consists of two strap bars each fitted with belt forks and a lever brought to the front.

Other Machines

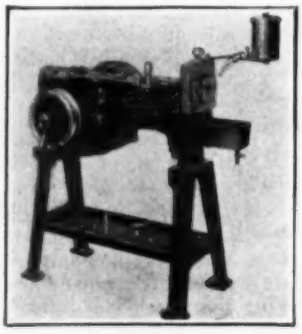
—43—

Broaching Machine, Small

Lapointe Machine Tool Co., Ltd., Edgware, England. [Vol.65,p.91E]

The small broaching machine is intended for large production in the lighter engineering industries where it is desired to use small and frail broaches.

The machine is controlled by one lever which operates two three-point hardened



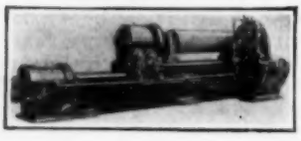
steel clutches through the hollow driving shaft. Carried in a tee slot in the ram are adjustable dogs for automatically operating the clutch, and determining the lengths of stroke. Special broaching fixtures may be employed to replace the faceplate adaptor. The stroke of the machine is 18 in., the size of the hole in the faceplate is 3 in. by 4 in., while that in the adaptor is 1¼ in. in diam. The machine occupies a floor space of 50 in. by 26 in. and the weight is 590 pounds.

—44—

Roll Fluting Machine, Special

Henry Broadbent, Ltd., Sowerby Bridge, England. [Vol.65,p.18E]

This machine was specially designed for fluting the coarse flutes used in oil mill rolls, and the fine flutes employed in flour mill rolls, both parallel and spiral. The machine will machine rolls of from 8 in. to 24 in. diam. and up to 6 ft. long. The bed is



14 ft. 6 in. long, and supports a table which carries the two capped stays for supporting the rolls together with the work headstock. The tool slides are mounted on a standard on an extension bed. The stays are adjustable lengthwise in tee slots to suit the different lengths of rolls; they have also a small transverse and vertical adjustment for setting the roll in alignment. The stay capacity is suitable for shafts up to 5¼ in. diameter.

The planed worktable is driven by a screw. It has a slow feed forward towards the cutting tools and a constant quick return of 40 ft. per min. All of the motions are operated automatically by means of reversing dogs. Six rates of positive feed are provided by gearbox, ranging from 12 to 72 in. per min. Faster feeds may be obtained by change gears.

A 10-hp. electric motor drives by silent chain through a gearbox to the driving screws; if preferred, the machine can be readily arranged for a single-pulley belt drive. The spiral motion for the flutes is obtained from the traverse of the table. The headstock has a special 20-in. two-jaw chuck.

—45—

Hobbing Machines, Horizontal

Dowding & Dickinson, Windsor House, Victoria Street, London, S.W., England. [Vol.64,p.190E]

The horizontal hobbing machines work on the firm's usual generating principle, but are slightly modified from the ordinary type. In the fully-automatic machine equipped as a universal hobber the work is held either between centers or in a draw-in collet. The maximum distance between the centers is 13¾ in., while the maximum diameter hobbed is 6¾ in. The maximum pitch hobbed is 8, with a maximum tooth angle for spirals of 60 deg. The machine is intended for special work, including screw spindles with large helix angle, spur gears of small diameter with wide teeth, and spline shafts.

Spiral gears are produced by means of the differential gears, which provide both the indexing motion and the necessary acceleration or retardation of the work in relation to the automatic table feed. The maximum hob diameter is 3$\frac{5}{16}$ in., the maximum hob length 2¾ in.

A machine of similar type but simpler, is intended for quantity production, cutting spur or spiral gears up to 3 in., and spiral spindles up to 1$\frac{5}{16}$ in. diam. In this case the hob spindle is horizontal. No differential gearing is provided, the movement required from the dividing wheel spindle in addition to

the index movement being obtained from the dividing change wheels.

The maximum length of tooth face hobbed is 5$\frac{13}{16}$ in., the maximum hob diameter being 1$\frac{31}{32}$ in. by 2¾ in. long, the number of teeth to be hobbed ranging from 2 to 100, the maximum tooth angle for spirals is 80 deg., and 12½ is the maximum pitch hobbed.

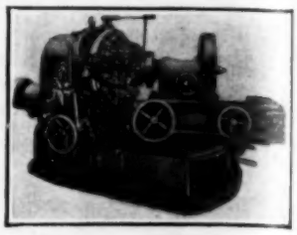
—46—

Gear Planer, Spiral Bevel

Oerlikon Machine Tool Works, Switzerland. [Vol. 65,p.122E]

The spiral bevel gear planer will handle blanks having a maximum diameter of 19 in., and is suitable for motor-truck and motor-bus rear-axles. The machine is claimed to work on a true geometrical basis, two cutting tools being used which move with straight-line reciprocating motion directed in the cutting stroke towards the pitch cone apex. The gear blank itself has a regular continuous rotary motion on its own axis, and produces not only the spiral shape of the teeth, but also the necessary dividing motion, no extraneous dividing devices being employed.

As the teeth profiles are produced by a generating process, formers or templates are unnecessary. Instead of being completed one at a time, the gear teeth produced



are planed simultaneously.

The drive to the machine is through a gearbox giving seven cutting speeds, and 15 changes of automatic feed are provided. All the operating levers and handwheels are placed on one side of the machine under the immediate control of the operator and are so arranged as to leave the work and tools in full view. The maximum spiral angle is 83 deg. and the minimum 7 deg. The maximum pitch cut is 2½, the maximum stroke of the tools is 6½ inches.

—47—

Hammer, Pneumatic, 30-Cwt.

B. & S. Massey, Ltd., Openshaw, Manchester, England. [Vol.64,p.177E]

The 30-cwt. pneumatic power hammer weighs 37 tons, and is thought to be the largest pneumatic power hammer ever built. The features include those of the firm's pneumatic power hammers of overhanging type. The maximum stroke is 39 in., the clear space between the slides 20½ inches.

The drive is by a 50-hp. electric motor, the maximum power taken on full load being 75 horsepower.

The automatic blows are given at the rate of 75 per min. The single blows can be struck without the use of a timing device and without reference to the position of the pump piston in its travel. The change from single to automatic blows is made instantaneously by the movement of the hand lever.

The hammer cylinder, pump cylinder, and valve chest are in a single casting, the ports being so arranged that the upper end of the

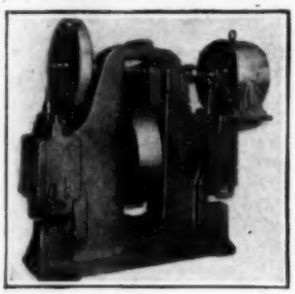
hammer cylinder acts as an air buffer. The standards have adjustable slides of forged steel with double vees. The anvil block is a casting separate from the baseplate and weights about 12 tons.

— 48 —

Cropping Machine, Bar, Double-Ended

Scott Bros., Ltd., Halifax, England. [Vol.65,p.36E]

The double-ended bar cropping machine crops flat bars up to 5 in. wide by 1 in. thick at one end, and round, square or hexagon bars at the opposite end of the machine.



The body of the machine consists of two heavy box-section castings, bolted together at top and bottom. The drive is by 20-hp. motor mounted on a bracket.

A forged-steel eccentric shaft gives a stroke of 2¼ in. to the rams and top blades. Each ram contains a steel tappet and draw-block for the stop motion; also an involute steel spring balance is fitted to keep the ram at the top of the stroke when the machine is not cutting. The blades are 5 in. deep by 1¼ in. thick. They have two V-shaped recesses to suit different sizes of square bars.

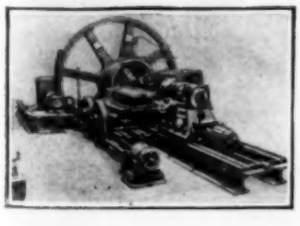
— 49 —

Ingot-Slicing Machine, 24-Inch

J. Holroyd & Co., Ltd., Milnrow, Rockdale, England. [Vol.65,p.170E]

This 24-in. Ingot-slicing machine is designed for cutting steel ingots into several blooms simultaneously, and will take ingots 12 in. in diam. by 5 ft. 6 in. long up to 24 in. in diam. by 8 ft. 6 in. long.

It is built up on T-slotted



cast-iron girders, embedded in concrete. Three electric motors are employed, the main driving motor being of 125 hp. A 6-hp. motor is used for the traverse of the tools and a similar motor is employed for the quick adjustment of the loose headstock, the final adjustment up to the work being by hand. The drive to the fixed headstock is through a reduction gearbox with heat-treated steel gears.

The main spindle is a steel casting running in cast iron bearings at speeds ranging from 5 to 17.5 r.p.m. It carries a four-jaw steel chuck. The large gear on the spindle is of cast iron, in halves bolted together.

The loose headstock carries a spindle with a steel bell chuck for gripping the ingot shank. The maximum distance betwen the chuck faces is 9 ft. and the minimum distance 5 ft. 6 inches.

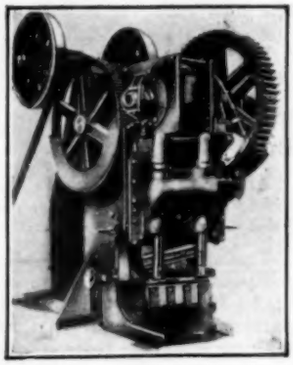
— 50 —

Scrap Shears, 40-Ton

Henry Pels, Osnaburgh St., London, N. W., England. [Vol.65,p.188E]

The machine weighs about 43 tons and is capable of handling large and bulky hull or deck portions of ships' scrap. Sections can be cut up in the assembled state.

The frame is constructed of high-tensile armor-plates secured by fitted bolts. The interchangeable shear blades



are set angular in relation to the gap. The effective depth of the gap is 30 in., with a maximum clearance between the blades of 14¼ in. The machine is designed for a continuous shearing pressure of 480 tons, and plates up to a thickness of 2¼ in. can be dealth with, while at one stroke 30-in. by 2¾-in. flats, or 5-in. rounds and 4¼-in. squares can be cut.

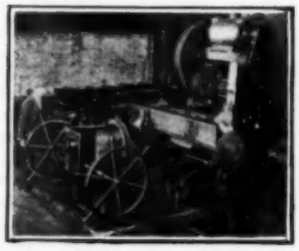
The upper blade can be automatically arrested at the completion of each stroke, or the mechanism can be arranged to operate the blade continuously. A positive claw-type clutch is used. The automatic kicking strap provided is adjustable for different thicknesses of material. Overload is prevented by means of a shearing pin.

— 51 —

Straightening Machine, Axle

Scriven & Co., Ltd., Leeds, England. [Vol.64,p.172E]

A special single-ended motor-driven machine for straightening railway and other axles has a load capacity up to 250 tons, and



will handle axles up to 10 in. diam. The main frame has a cast-steel box-section body, bearing a reciprocating slide with a wide planed face on which two steel bending hammers can be adjusted to differing centers up to 7 ft. The slide is actuated by means of an eccentric shaft and two toggles. The eccentric shaft is driven through double-purchase spur gearing from a 25-hp. motor.

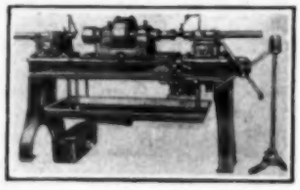
At the left-hand end of the machine a setting hammer moves in guide ways, and is adjustable by a screw. A cradle permits the axle to be rotated easily. On brackets in the bed of the machine are four rollers that allow the cradle and axle to be easily pushed across the machine and straightened at any point.

— 52 —

Tapering and Reaming Machine, Tube

Holroyd & Co., Ltd., Milnrow, Rochdale, England. [Vol.65,p.150E]

This tube tapering and reaming machine is designed for machining external and internal tapers on copper tubes up to 2¼ in. in diam., for fireboxes. External tapers are produced by means of a special cutter head, while internal tapers are milled with a taper cutter which is arranged to ex-



pand the tube slightly at the end.

A straight bed carries a sliding head and two self-centering vises which have jaws that grip the tubes. The vises are arranged with fixed stops for positioning purposes, and an outer support is provided for long tubes. The rotating spindle is driven by pulley at 150 r.p.m. One end of the spindle carries a special cutter head, the other being bored Morse taper to take the milling cutters. Power feed at the rate of 0.01 in. per rev. in each direction, with automatic trip, is provided.

The machine occupies a floor space of 6 ft. 7 in.x2 ft. 4 in. It will taper the outside and ream the inside of a tube with a wall thickness of 1 in. to a feather edge in 5 min., including setting time.

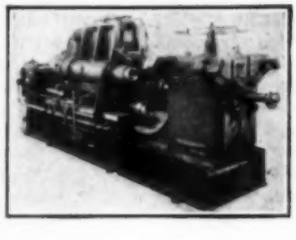
— 53 —

Trepanning Machine, Four-Spindle, for Disk Wheel Centers

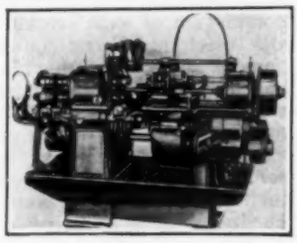
Armstrong, Whitworth & Co., Ltd., Openshaw, Manchester, England. [Vol.64,p. 188E]

This four-spindle trepanning machine is for cutting the drag holes in the disk wheel centers of railway wheels. The operating head carries four horizontal spindles, three fixed and the fourth adjustable. It can trepan two to four holes up to 6 in. in diam. simultaneously. A two-position turret is used, and while one wheel is being trepanned, the other is being loaded. The turret rotates on a pillar on ball bearings, and the positions are located by means of plunger.

The drive is by a 25-hp. motor at the back of the machine, by shaft and spiral bevel gears to a cross shaft, from which motion is obtained to drive the three



main spindles by worm gearing. The fourth spindle is driven by spur gears mounted on a swing frame with link from a fixed spindle. The headstock is provided with feed through a nut and screw controlled by a single lever which can also be used to operate the quick traverse.



— 54 —

Automatics, 4-Spindle, Schütte

A. C. Wickman, Ltd., Coventry, England. [Vol.64, p.258E]

The Schütte four-spindle automatics are available in three sizes: the smallest to take bars ⅞ in. in diam. and up to 3¼ in. long; the largest, 2 in. diam. by 5½ in. long. Castings up to 6 in. diam. can also be handled in this machine. The medium-sized machine will take bars 1⅜ in. diam. and turn lengths of 4¾ in., cutting Whitworth threads up to ⅝ in. A revolving drum or cylinder carries the four spindles, indexing to 90 deg. after each operation. Each of the spindles has ten speeds ranging from 132 to 600 r.p.m. with 35 feeds.

The machine has four cross slides, with one main tool slide for four cutting tools and two block tools, all arranged axially. The spindles work simultaneously, and a piece is produced at each indexing.

The indexing of the cylinder is actuated by a cam and segment gears. The cross slides are independent of each other and of the main tool slide.

Another feature is the stop cross with hardened set screws on the spindle head, which allows accurate forming to be done, so that diameters are not dependent on the setting of the cam drum underneath the machine, and the usual variation is overcome.

Testing Machines

— 55 —

Testing Machine, Universal, 1,250-Ton

W. & T. Avery, Ltd., Soho Foundry, Birmingham, England. [Vol.65,p.2E]

This universal testing machine will exert a pull of 1,250 tons, and is for use on experimental work for full size bridge members. The machine has been designed

for testing braced members of structures up to 50 ft. in length in tension and compression, and up to 20 ft. in span transversely. Complete lattice girders may be tested in this way.

The machine consists of a weighing system at the left-hand end and a straining system on the right hand, with crossheads between them. A rigid framework is provided, and the heavy end castings are connected by a bed of trough-shaped castings, with two lines of steel plate girders at the top. For straining purposes, a double-acting hydraulic cylinder and ram are employed. The ram has a stroke of 5 ft. 6 in. The steel casting forming the head for the main ram carries the ends of four straining rods which run the full length of the machine and are supported at intervals on trolleys. These rods are reduced in diameter at equally spaced intervals so that the main traveling crosshead may be set according to the length of the specimen under treatment.

On the steelyard of the weighing system the load is balanced as indicated by the movement of a poise which is traversed along it by a handwheel and screw.

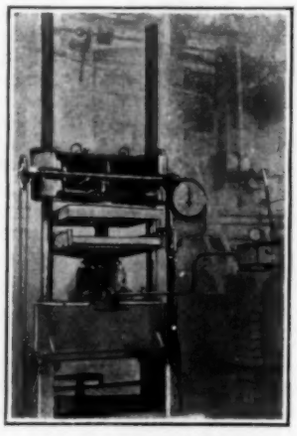
— 56 —

Testing Machine, Compression, 100-Ton

W. & T. Avery, Ltd., Soho, Birmingham, England. [Vol. 65,p.94E]

The 100-ton compression testing machine has a cast-iron cylinder, bored and fitted with a cast-iron ram, machined to take the spherical seating of the bottom platen. The load is transmitted through the specimen and top platen to the crosshead, which is attached to the straining rods. The straining rods are anchored on the underside of the cylinder, and the full load of the test is taken on these rods, the elastic properties of which are used to measure the load applied.

The straining rods each have a hole bored up the center, in which is suspended a connecting rod. The elongation produced in the



straining rods during the test is transmitted by the connecting rods to a system of levers in the base of the machine, these operating the load indicator.

The testing machine is operated by a two-piston oil pump, hand-driven by lever. The pump delivers by a pipe line from the pump body into the high-pressure cylinder of the machine.

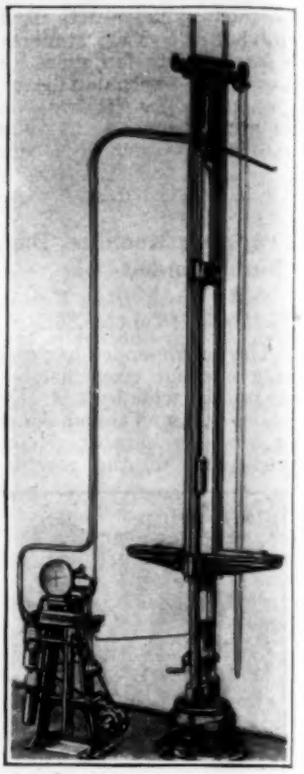
— 57 —

Testing Machine, Buckling

Alfred J. Amsler & Co., Schaffhouse, Switzerland, [Vol.65,p.110E]

The machine is for making compression tests of pieces up to 10 ft. in length, and is particularly designed for making buckling tests of airplane parts. The machine is being marketed in England by T. C. Howden & Co., 191 Corporation St., Birmingham.

The upper plate is fixed to a movable crosshead, which can be adjusted in height along the columns of the machine. The maximum load allowable is 20 tons. The machine can be used for tensile tests on flat bars up to ¾x2 in., and wires and bars of a maximum diameter of 1 in. For compression tests a fixed upper plate and a



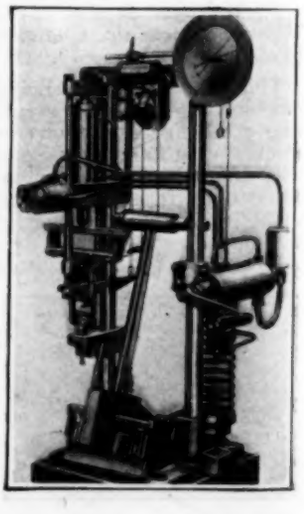
lower plate resting on a spherical seat is used. The space available between these two plates is about 126 in. The machine can also be arranged for other tests.

— 58 —

Testing Machine, Universal, for Wood Tests

Alfred J. Amsler & Co., Schaffhouse, Switzerland, [Vol.65,p.110E]

This 4-ton universal machine is for testing wood used in airplane construction. It is being marketed in England by T. C. Howden & Co., 191 Corporation St., Birmingham.



It can be used for making static tests in bending, compression, tension by splitting and for hardness, and also for dynamic tests by bending.

The bar is placed on two cylindrical supports, compressed against a similar support in the middle. Both the load and the amount of bending are indicated on a dial. The maximum pressure exerted is about 900 lb. For compression, the maximum pressure available is 9,000 lb. For the tensile test the bar is cut fork-shaped at the ends along its axis, and the four branches are held in two grips which tend to separate the annular rings of the wood. The splitting test is similar. A 10 mm. ball under definite pressure is used for the Brinell test, and a special depth indicator is supplied. Hardness is determined by the Janka method. Dynamic test involves the use of a pendulum. The loads exerted are measured by a spring dynamometer, the loading being produced by a screw-pump.

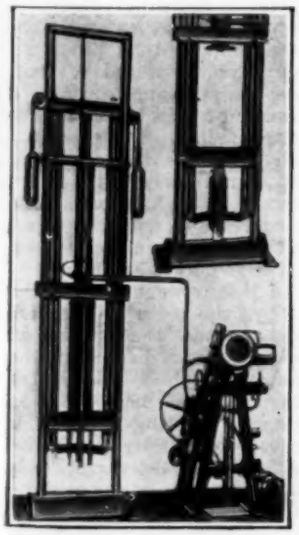
— 59 —

Testing Machine, Spring

Alfred J. Amsler & Co., Schaffhouse, Switzerland. [Vol.64,p.260E]

A 10-ton machine has been specially built for testing statically compression and tension springs for guns, etc. It consists of two parts, a press and a pendulum dynamometer with cam pump for exerting and measuring the load acting on the spring.

The stand of the hydraulic press consists of a base with two fixed columns and a crosshead carrying a ram. The cylinder of the ram carries a movable crosshead and



frame conterbalanced by a weight. The arrangement is such that the spring can be tested either in compression or in tension. For compression testing the spring is held between four guide pins to prevent buckling. The stroke of the ram is about 27½ in., and a relief valve stops the ram at its uppermost position.

The machine can grip compression springs up to 45¼ in. long and tension springs up to 17⅞ in. long.

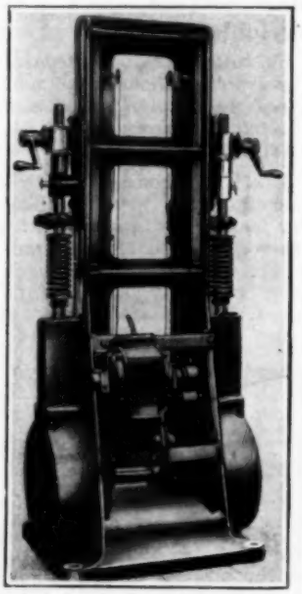
The pendulum dynamometer is arranged for four degrees of sensitiveness, namely, 1, 2, 5 and 10 tons.

— 60 —

Testing Machine, Spring, Fatigue

Alfred J. Amsler & Co., Schaffhouse, Switzerland. [Vol.65,p.260E]

The machine shown is designed for making fatigue tests of valve springs for high-speed internal combustion engines and other coil



springs in compression. It can be also arranged for fatigue tests in tension and in bending. Two springs can be tested simultaneously. The test of the spring consists in stressing it a small amount and then unloading it consecutively a number of times until the spring breaks. A counter, which is stopped immediately the spring breaks, indicates the number of times the spring has been loaded.

The loading and unloading action is produced by a motor-driven flywheel with a crank and connecting rod for producing a reciprocating motion. The throw of the crank can be varied to give a travel to the moving platform of from 0 to 4 in. The maximum load exerted is about 440 lb. The extended length of the largest spring that can be tested is 24 in. The spring is reciprocated about 1,000 times per minute.

— 61 —

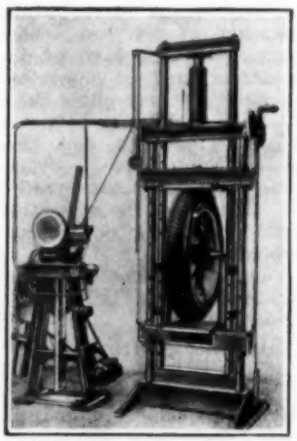
Testing Machine, Automobile-Wheel

Alfred J. Amsler & Co., Schaffhouse, Switzerland. [Vol.64,p.179E]

This machine has been specially constructed for compression tests on automobile wheels and also for transverse tests on leaf springs for all motor cars and lorries. The machine can also be used for the ordinary compression, transverse and tensile tests.

It consists of two separate parts, namely, the testing machine proper and the load indicator with an oil pump fitted to it. The testing machine works on a hydraulic press principle.

The part to be tested is supported between two crossheads, one of which is locked to the upright columns of the



machine frame; the other cross-head is locked to two columns which are suspended to the cross-head carried by the ram of the hydraulic press. Each cross-head can be locked either to the fixed or to the suspended columns, so that either compression tests or tensile tests can be made. The available space for compression tests is 55 in. and the clearance between the columns is about 18 inches.

For tensile tests the machine can grip flat bars and strips up to 1½ in. thick and 2 in. wide at the ends, and wires and round bars without heads up to about 1 in. in diam. The machine can also be set up for the Brinell hardness test with a depth indicator.

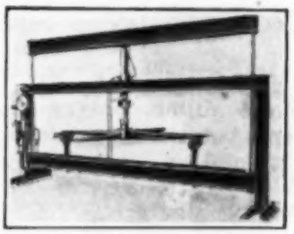
The Amsler pendulum dynamometer is used in conjunction with the machine and is arranged for four degrees of sensitiveness, 10, 5, 2 and 1 ton.

— 62 —

Propeller Testing Machine

Alfred J. Amsler & Co., Schaffhouse, Switzerland. [Vol.65,p.110E]

This special machine is for making bending tests on airplane propellers with two or four blades. The machine can also be arranged to make ordinary compression tests.



It is marketed by T. C. Howden & Co., 191 Corporation St., Birmingham, England.

The bending machine works on the principle of a hydraulic press. The oil pressure measures the load exerted during a test, and can be determined by means of a spring dynamometer. A cam pump supplies the pressure.

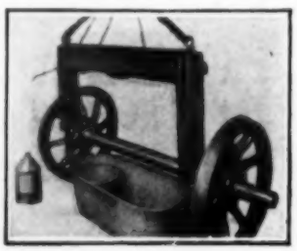
The span of the supports is adjustable from 3 to 13 ft. The travel of the ram is about 10 in., and the maximum load indicated on the dial is 10,000 pounds.

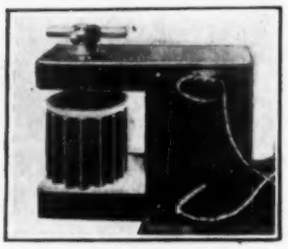
— 63 —

Flaw Detector, Magnetic

Equipment & Engineering Co., 2-3, Norfolk St., Strand, London, W.C., England. [Vol 65,p.69E]

The standard form of magnetizer developed for the purpose of testing railway





axles consists of a large coil wound suitably for operating on a direct-current traction circuit of 500 to 550 volts and taking about 150 watts. The pole pieces are lengthened to span the axle over one of the wheels, for it is found that the cracks usually occur adjacent to the wheel hubs and near the gear wheel key recess. The magnet can be suspended from any suitable crane or fixing above. So that it can be easily turned, the axle with the wheels is supported on a roller bed set in the floor. The detecting link used is specially prepared.

The detecting solution is poured over the axles wherever a defect may be suspected and the magnetism causes the iron particles of the detecting solution to show as a ridge at any crack.

The principle is also applied in a tester for motor pinions, and a solenoid magnetizer is being developed for ball races and other small steel parts. Here the article is dropped into the solenoid and falls into a bath beneath.

Miscellaneous Equipment

— 64 —

Wood Miller, Universal, Semi-Automatic

Wadkin & Co., North Evington, Leicester, England. [Vol.65,p.56E]

A description of this machine can be found under item No. 236, page 123, in the American section of this issue.

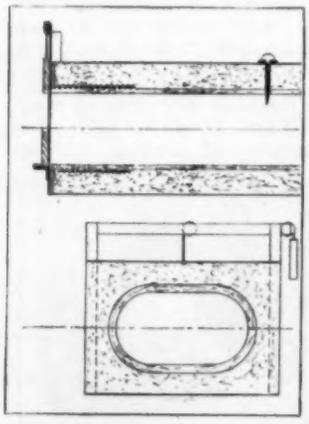
— 65 —

Furnace, Electric, Continuous, Automatic

Automatic & Electric Furnaces, Ltd., Farrington Road, London, E. C., England. [Vol.65,p.44E]

The electrically-heated hardening and tempering furnace has been constructed for dealing with wire and strip steel, as for band saws, etc., the material beind fed continuously through the furnace from the roll.

The furnace is approximately 9 ft. long and consists of a number of Wild-Barfield standard heating chambers placed end to end and assembled as one complete unit in a metal case, the space between the chamber and the outer casing being lagged.



Steel strip 6½ in. wide by 0.048 in. thick is heated up to 825 deg. C. at the rate of 4.1 ft. per min., or 259 lb. per hr., with a current consumption of 21 kw. The chamber is 4 in. high by 11 in. across, and is connected to a 400-volt three-phase supply with 200 bolts between phases. At each end the furnace has removable doors made of a refractory material machined to suit the section of the work passing through.

The method of controlling the temperature is entirely automatic.

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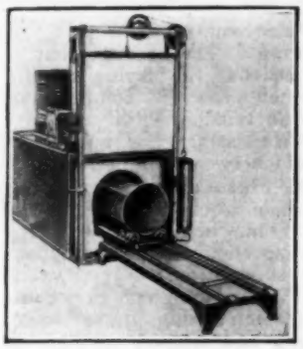
Furnace, Casehardening and Annealing, Electric, Low-Voltage

Rustless Surf-Alloy, Ltd., Windsor House, Victoria St., London, S. W., England. [Vol.65,p.171E]

The electric furnace shown is for casehardening and annealing. Its special feature lies in the formation of the heating element which is a sheet of nickel chrome or similar steel and forms the inner lining of the furnace. It is heated by a heavy current of electricity at a low voltage supplied through a specially designed transformer. Temperatures of



1,000 to 1,100 deg. can be maintained without the production of a hot box.

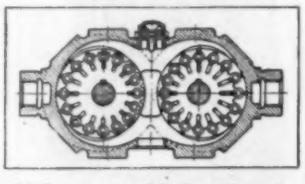
The furnace operates on a voltage of 3 to 8, according to size. The low voltage combined with the massive nature of the resistor or element is said to preclude the possibility of burning out as a result of touching the element with other metallic articles. Due to the heat being generated in the lining itself, it is said that maximum radiation is obtained.

— 67 —

Hydraulic Drive, Machine-Tool, Variable Speed

Fortuna-Werke, Stuttgart-Cannstatt, Germany, and Eisenwerk Wulfel, Hannover Wulfel, Germany. [Vol.64, p.181E]

The drive consists of two energators, as they are called, one acting as a pump, the other as a motor. The pump is driven in any convenient way, generally at constant speed. Its shaft carries a drum with radial slots, in



which move blades bearing on the interior of a cylinder. Each blade is supported by two rollers, with guide rings on the cover plates of the casing. To create the working chamber of the pump, the casing is eccentrically displaced relative to the drum shaft, thus causing a change in pumping capacity at a given driving speed.

Safety valves limit the hydraulic pressure set up. Variation of eccentricity of the pump drum regulates the quantity of oil necessary for the motor, which is driven by the fluid pressure introduced. The speed of the motor drum may also be controlled by changing the eccentricity of the motor casing. In the double energator pictured the pump and motor are in one cylinder block. When applied to a lathe the motor drum is attached to the spindle and the pump is placed in the leg.

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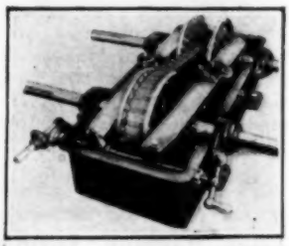
Transmission, Variable-Speed, Chain Drive

P.I.V. Gear Syndicate, Ltd., 7 Princes Street, Westminster, London, S. W., England. [Vol.65,p.45E]

This chain-drive transmission is positive, but variable by an infinite number of steps between the limits set. It is proposed to use the gear in connection with machine tool drives, and as the speed ratio can be altered while



the chain is under load the gear can be used to change cutting speeds to suit hard spots or gaps as they are met in parts being machined. These variable-speed boxes are being manufactured in standard sizes from 5 to 30 hp. The usual speed ratio is 6:1, but this can be arranged according to requirements.

The inner surfaces of the two conical halves of each pulley have a series of ribs or teeth, leaving radial channels between of constant depth. The teeth engage with the edges of the driving chain.

The driving chain is formed by a series of slotted links connected by pins. In each slot is placed a strip steel casing which contains a number of thin steel laminations or slats. Each lamination can slide independently and transversely to the chain length. The chain sets itself to correspond with the wheel teeth at the diameter on which it may be working.

In the arrangement of the pulleys the teeth of one disk are opposite the spaces on the adjacent disk. In the design the slack side of the gear is uppermost and on this side a spring-loaded shoe bears, to compensate automatically for the variation in chain length corresponding to variation of speed ratio.

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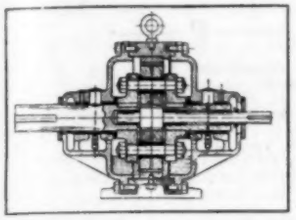
Reduction Units, Speed, Concentric

Crofts (*Engineers*), *Ltd., Bradford, England.* [Vol.65, p.70E]

Single, double and triple reduction gears or speed transformers are being made in sizes to transmit ½ hp. and upward, and for ratios up to 1,000 to 1. The construction of a single reduction gear of



this type is shown in the illustration. The multiple gear sets consist essentially of single gears in series.

The driving and the driven shafts are concentric, and the sun pinion drives a series of planets, the planet pinions gearing with a fixed internal wheel. All the gearing is supported on both sides. A pilot runs in the driven shaft, and a long bearing is provided for the sun gear. The internal ring is fixed. All the gears are cut from steel.

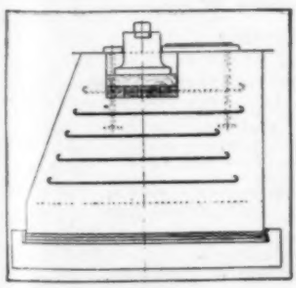
The housing is of cast iron, the main bearing and bushings of the pinion being of phosphor-bronze. The gears rotate in an oil bath, and the main bearings are lubricated by rings. The design easily lends itself to conformity with the outline of the electric motor to which the gear may be applied.

— 70 —

Foundations, Machine, Vibration-Isolating, "Coresil"

W. Christie & Grey, Ltd., 4, Lloyds Ave., London, E. C., England. [Vol.64,p.170E]

The "Coresil" system has been developed for isolating the vibration and noise caused by the operation of



metal and woodworking machinery. Between the machine foundation block and its permanent support is introduced an elastic material that absorbs vibration by reason of the internal friction set up in the material itself. "Coresil" consists of virgin cork impregnated with a preservative, and has been standardized. It is set into iron frames and forms plates up to a maximum size of 18 sq.ft. each and of a uniform thickness of 2½ in. Springs and Coresil may be combined where suitable.

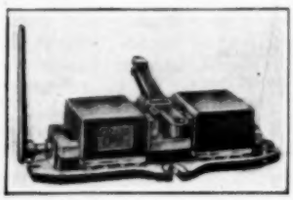
The illustration shows the application of this system to the foundation for a 1,400-lb. steam hammer. Upon a ferro-concrete raft are placed layers of resilient plates on which the foundation block is built. The space between the sides of the resilient plates and the concrete raft is sealed with asphalt filling.

— 71 —

Vise, Machine, Adjustable-Jaw, "Berjo"

Alfred Herbert, Ltd., Coventry, England. [Vol.64.p. 227E]

This company is marketing in England the "Berjo" adjustable-jaw machine vise.



The details of construction and operation of the vise have been previously described on page 1065, Vol. 63, of the *American Machinist.*

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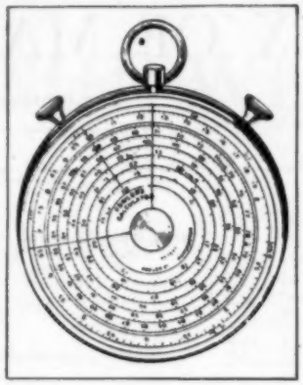
Calculators, Pocket

Fowler & Co., Station Works, Sale, Manchester, England. [Vol.64,p.247E]

Two types of pocket calculators have been designed, the Long Scale Calculator and the Circular Slide Rule. The instrument measures 2⅝ in. in diam. by 1/16 in. in thickness, and is fitted with two calculating dials. It is protected from injury by a nickel-plated, velvet-lined case for pocket use.

In the Long Scale type the front contains a single rotating dial operated by a knurled nut at the periphery of the instrument, and with a rotating radial cursor operated by a second knurled



nut. A fixed radial datum is marked on the cover glass. Around the outer circumference of the front dial is the engraved multiplying and dividing scale. Inside of this is another scale extending consecutively over six circles, with a united circumference of 30 in. The construction enables results to be obtained with great accuracy. The back dial enables squares, square roots, logarithms, sines, cosines, tangents, cotangents, etc., to be obtained by direct reading.

In the Circular Slide Rule the outer scale is fixed, and inside are five scales on a rotating dial. The fixed scale is the ordinary logarithmic one for multiplication and division. The next, which rotates, is a duplicate of this; the third is a scale of logarithms; the fourth, which extends consecutively over two circles, is a scale of square roots; the fifth gives log, sines, and the sixth, log. tans. The back dial gives reciprocal cube roots and log. sines for small angles.

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Marking-Out Table, Magnetic

Alfred Herebert, Ltd., Coventry, England. [Vol.65,p. 24E]

The "Perfector" marking-out table holds the job magnetically, and can be set accurately in any required

plane for the marking-out machine, or for checking work that has been machined in jigs. The table measures 17¾ in. by 9½ in., and in the vertical position holds objects weighing up to 110 lb. By means of the handwheel, the spindle and the table can be rotated on a horizontal axis, the wheel being locked at positions 15 deg. apart by means of a plunger.

The table can also be set to any desired position by means of a vernier graduated to 5 min., being secured as desired by screw clamp on the face. The table also swivels on the spindle through 180 deg., being similarly set at positions 45 deg. apart by means of a plunger, and adjusted to 5 min. through a vernier.

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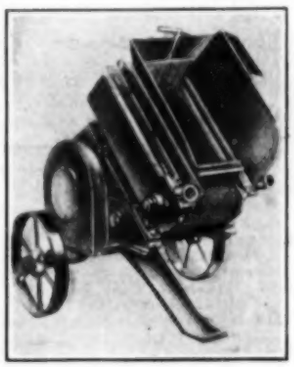
Mixing Machine, Sand

Pneulec, Ltd., Smethwick, Birmingham. [Vol.65,p.183E]

The Pneulec-Royer sand mixing machine aerates, separates, and blends molding sands in one operation. The machine is available in a number of sizes, portable or



fixed, up to outputs of 800 lb. per minute.

A special feature is the composition belt which is studded with steel sprigs spaced so as to form pockets for carrying sand. This belt is inclined at about 45 deg., and has a surface speed of 900 ft. per min. The sand is shoveled into a hopper and the bottom surface of the sand under treatment is raked by sprigs on the belt. The belt is unloaded centrifugally, the sand being thrown forward through a steel comb.

The scrap, nails, etc., fall to the bottom of the hopper, whence they are discharged. The stream of sand can be directed as required into a receptacle or onto a heap. The machine is driven by an electric motor which is totally enclosed in a housing in the machine body. The wheels have wide treads to make the mixer easily portable. The weight of the machine complete is 570 pounds.

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NEWS OF THE WEEK

Engineering Council Recommends Public Works Department to Congress

Hoover says standardization is greatest waste eliminator

ADOPTION of a definite legislative program covering public works was the important feature of the annual meeting of the American Engineering Council, which closed in Washington on Jan. 14 with a dinner at which Charles M. Schwab, president of the American Society of Mechanical Engineers, and Secretary Hoover, of the Department of Commerce, delivered notable addresses foreseeing new fields of usefulness for the engineering profession.

The assembly of the council sanctioned a public works measure to be introduced in the House of Representatives. The name of the Department of the Interior is changed to the "Department of Public Works and Domain" and provision is made for the reorganization and more effective co-ordination of the public works functions of the Federal Government.

The Secretary of the Interior would be designated the Secretary of Public Works and Domain. The Wyant bill also provides for an Assistant Secretary and not more than six directors of bureaus of equal rank. The assembly authorized the raising of a fund with which to prosecute a nation-wide campaign in support of the plan.

The safety and production study, it was reported to the assembly, is rapidly nearing completion. The scope and character of the results attained were presented at one session.

The speakers were L. P. Alford of New York, a member of the committee; J. E. Hannum, director of the study, and L. W. Wallace, executive secretary of the council.

A. W. Berresford, of Detroit, who is chairman of the safety and production committee, and O. H. Koch, representing the Dallas Technical Club, were re-elected vice-presidents of the council. Harrison E. Howe, of Washington, representative of the American Institute of Chemical Engineers, was again named treasurer. L. W. Wallace continues as executive secretary, and James T. Grady, Columbia University, publicity director.

The Assembly adopted a resolution urging the approval by Congress of the recommendation made by the Committee on Patent Office Procedure, referring to classification and salaries of officials and examiners of the Patent Office.

The administrative board voted to call a conference of engineering society secretaries at Cleveland, June 16 and 17. The conference is being arranged by a committee consisting of C. R. Sabin, of the Cleveland Engineering Society; Ernest Hartford, of the American Society of Mechanical Engineers; E. F. Treschow, of the Engineering Society of Western Pennsylvania; G. C. Dent, of the Society of Industrial Engineers; and E. G. Hethercut, of the Western Society of Engineers.

It was voted to hold the next meeting of the administrative board at the Engineering Societies Building, New York City, at a date to be fixed later.

Amplification and reconsideration of all present standards in industry was urged by Secretary Hoover, speaking at the dinner. He said that closer working relations were being established between engineers and the directors of industry. A new conception of standardization, following efficiency precedents already built up, he declared, will prove the surest path to the most effective principles of waste elimination in industrial history. In this movement, he said, the American Engineering Council, as in the past, would be the instrument through which reform would be effected.

J. H. Hunt Elected President of S.A.E.

For the first time in some years it was found impossible to persuade C. F. Kettering to act as toastmaster at the annual dinner of the Society of Automotive Engineers, held in the Hotel Astor on Jan. 13. He was present at the head table however, and was finally prevailed upon to say a few words. Hon. E. P. Warner, Assistant Secretary of the Navy for Aeronautics, was the toastmaster and the speakers were the retiring president, T. J. Litle, Jr., his successor, J. H. Hunt, and R. H. Grant, vice-president, Chevrolet Motor Co., whose subject was "What Sells Motor Cars."

Mr. Grant, analyzing the various branches of the automobile business, took up designing, producing, advertising, service stations and dealers.

In accordance with the provisions of the constitution, a short business meeting was held at which the election of the following new officers was announced: President, J. H. Hunt; 1st vice-president, W. G. Wall; 2nd vice-president, representing motor car engineering, J. F. Max Patitz; 2nd vice-president, representing stationary and internal combustion engineering, C. B. Jahnke; 2nd vice-president, representing marine engineering, P. G. Zimmerman; 2nd vice-president, representing aeronautic engineering, E. T. Jones; treasurer, C. B. Whittelsey; secretary and general manager, Coker F. Clarkson. The councillors for 1927 are: J. F. Winchester, Taliaferro Milton, F. F. Chandler, E. M. Wooler, C. B. Veal, S. W. Sparrow and W. L. Batt and K. L. Herrman, ex-officio.

Automobile Engineers at Show Dinner

Over five hundred members and guests attended the second annual auto-show dinner of the Metropolitan Section of the Society of Automotive Engineers. Several foreign representatives of the World Motor Transport Congress were guests, many of them speaking of their visit to the United States. Eleven speakers, mostly chief engineers of as many automobile builders, gave 5-minute talks outlining the new features of their respective cars. The speakers were: J. M. Crawford, Auburn; E. A. DeWaters, Buick; H. F. Smith, Chevrolet; H. T. Woolson, Chrysler; E. S. Marks, Franklin; Otis Lucas, Marmon; G. C. Mather, Paige-Detroit; W. E. England, Stearns; C. S. Crawford, Stutz; H. C. Snow, Velie; A. J. Baker, Willys-Overland. A. M. Wolf, consulting engineer, summed up the trend of development as indicated by the cars at the show.

Among the features mentioned were increased powers of engines in large cars, running up to over 100 hp. in one instance, higher engine speeds, vibration dampeners, balanced wheels to reduce shimmy, double breakers on ignition apparatus, counter-balanced crankshafts, larger bearings, rubber- or spring-mounted engines and crankcase ventilation. The effect of frequent changes on service stations was brought out by a builder of small cars.

Small cars are receiving more care. Lighter weight with standard tread gives a low center of gravity. Four-wheel brakes aid in securing safety. There is a tendency toward smaller wheel diameters and somewhat larger tires. Larger carburetors are also being used.

Packard Gives Million

The trustees of Lehigh University announce a gift of one million dollars from James Ward Packard, the money to be used to establish an electrical and mechanical engineering laboratory in the university at Bethlehem, Pa. Mr. Packard, originator of the Packard automobile, graduated from Lehigh in 1884. Preliminary plans have been made for a building that will accommodate 500 students and will be equipped with the most modern apparatus.

The Business Barometer

This week's outlook in Commerce, Finance, Agriculture and Industry

By THEODORE H. PRICE
Editor, Commerce and Finance, New York

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TO ALL who are stirred by the desire to know the unknowable and to unscrew the inscrutable that is so powerful at the beginning of a new business year, we recommend that they read a one-act play by Lord Dunsany that is published in the January *Atlantic Monthly*. It is called "The Jest of Hahalaba" and it tells of a wealthy Englishman who, with the aid of the spirit named in the title, obtained on the evening of Dec. 31, 1926, a file of the *London Times* for 1927. Turning to the last copies first he looked for the stock market reports, and as he jotted down the names of shares that would make him large profits during the year to come he exclaimed that he would be the richest man in the kingdom. So he steadily turned the pages over, reading one item after another that denoted opportunities to add to his wealth, until he came finally to the issue of Jan. 1, 1927. There heading the obituary column, was the notice of his own death, and the shock of reading it killed him.

Most evaluations of the "business outlook" are as useless as the knowledge thus so tragically obtained. It is in fact a blessing that the future is a closed book except to the imagination, for if it were opened all of us would perforce become fatalists and the will and ability to work would be atrophied. Therefore it is safe to say that the record would be one of pain and disaster, which in our ignorance we now escape because the divine qualities of faith and enthusiasm are not destroyed, but only kept in bounds, by intelligent prevision and precaution.

Few of us are called upon even to try to guess what the New Year holds in store. And even those who by the nature of their business or their leadership are compelled to take steps in the dark, and who have established elaborate statistical and research departments to guide them, have nevertheless learned that it pays to take as little as possible for granted and to be prepared at all times to stop, turn around, or go off in another direction.

Thus it is neither necessary nor worthwhile to say more of the outlook than that it suggests the desirability of an alert conservatism as the policy most likely to make 1927 a satisfactory year. Since New Year's Day some signs of business recession have been apparent but other facts counterbalance them. Thus the trade reviews report seasonal dullness and some authorities who will not allow themselves to be quoted say business is not as good as last year. But steel orders and production are picking up a little and the makers point to impending expenditures of $900,000,000 for new equipment by the railways as assurance of better times coming. Automobile output is increasing again, too, and the presence and optimism of the supersalesmen at the annual show in New York this week has noticeably heartened public sentiment although it has not deterred some selling of the "motors" on the Stock Exchange by those who believe the 1926 record marked the industry's peak.

Cautionary statements are further offset by easier money and predictions that the New York Federal Reserve Bank will reduce its rediscount rate, for it is unthinkable that a serious depression should be ushered in by declining interest rates. The Federal Reserve Banks' combined reserve ratio jumped sharply last week to 75.4 per cent. Commercial paper and acceptances have recently been reduced, the Belgian and German bank rates have been cut, the Bank of England is expected to follow suit, and gold is again flowing into America in large volume, mostly from Canada. The stock market has not yet been revived but the professional operators seem to find as many deterrents to selling as they do to buying. And the announcement that the long discussed merger of the Hill roads in the Northwest that is under way may again inflame speculative sentiment in the rails.

Distributive trade reports are somewhat mixed. From declining car loadings it is evident that less merchandise is moving and a great many department stores seem to be advertising cut-price sales, but it is difficult to say whether the number exceeds last year. If so the digestion of the merchandise may impede trade for a time but it will not be a long process.

Among the less favorable reports is a survey conducted among architects and builders by the Architectural Forum, which indicates a 12 per cent reduction in building during 1927.

No uniform trend is discernible in the commodity markets. The surprising strength of cotton is due to a belief that ginnings will not equal the government estimate and to the high percentage of low grades in the crop. But the bulls view the advance with some apprehension for fear it will imperil the acreage reduction which is counted on for permanent recovery. Dry goods trade is better.

The farmers are the only complainers at present, and it may be taken for granted that they will remain hard-headed individualists until the end of time, but it is also evident that their purchasing power is seriously curtailed and that some way to equalize the profits of commerce, finance, industry and agriculture must be found if we would have prosperous times all around.

WHAT'S DOING IN INDUSTRY

THE PRESENT trend of business in the machinery and machine tool markets would seem to indicate a period of increased sales volume in the first quarter of the year. Manufacturers and dealers report greater activity than had been expected for January, and the number of inquiries coming from sources that are known to be in need of shop equipment leads to the conclusion that there is considerable buying to be done in the near future.

DETROIT at last seems to be awakening from its lull, automobile manufacturers placing orders as soon as the public's acceptance of new models assured sales commensurate with new production schedules. Sales and inquiries are growing in Milwaukee, registering a quick recovery from the holidays. Automotive and accessory plants in the Cleveland district are opening up and general industrial activity is good. The week was quiet in Cincinnati, but the large volume of inquiries is expected to bring immediate business.

NEW YORK is experiencing general industrial activity and sales and inquiries have both shown a forward trend in the past week. New England is swinging into 1927 stride with a satisfactory condition throughout the trade. Buffalo got off to a slow start this year but is gradually recovering. In Philadelphia, orders are not large but machine shops and public utilities are inquiring for equipment.

The Industrial Review

Weekly progress of the machinery and machine tool business

THE following reports, gathered from the various machinery and machine tool centers of the country, indicate the trend of business in these industries and what may be expected from the future:

BUFFALO

With a few exceptions January got away to a slow start in this market. The middle of the month, however, began to produce signs of improvement. It is interesting to note that many dealers in totaling the final figures on December business found that it had been better than they had at first thought.

Two or three dealers in the local field closed some real business directly after the fifth of the month, and they note that inquiries are more quickly productive of business than at any time since the war. Some inquiries this year were almost immediately followed by the closing of business.

Demand for contractors' equipment is at a low ebb, although snow removal equipment is selling good. Dealers are viewing with interest the letting of contracts this month for state buildings. Demand for electrical equipment is slightly better than it has been any time in three months.

PHILADELPHIA

While the last two weeks have not been productive of outstanding orders from users of machinery and machine tools, inquiries received by dealers in Philadelphia were of a substantial character. They portend early orders, and the larger dealers and producers looked optimistically at the first three weeks of the new year.

Machine shops in Detroit, Chicago and New York have been purchasers of hoists in Philadelphia, and some substantial purchases of heating plant equipment have been closed by the Consumers' Power Co., Detroit, and by the Boston Edison Electric Illuminating Co.

Dealers and producers of horizontal and vertical boring machines have received inquiries from a dozen industrial concerns in the Middle-West, and some inquiries for this equipment has come from some of the Mid-Western railroads.

Electric railways in different sections of the country give evidence of anticipated early buying, through inquiries received from machinery and machine tool dealers.

CINCINNATI

In the past week Cincinnati machine tool manufacturers and selling agents have found the market to be rather quiet. This condition, however, is regarded as normal for the season, and all members of the trade express the belief that business will liven up in a short time.

The greater part of the week's business consisted of orders for single tools and replacements, coming from various classes of users. The sales were well diversified as to sizes and types of tools and were distributed over the country. A few single orders came from concerns in the automotive industry, and some from railroads.

Inquiries, it is stated, came in from all sections of the country, from various industries and for all types and sizes of tools. Judging by the inquiries coming from the automobile field it is thought that this industry is about to begin buying in a more liberal way. Railroads sent in a few scattered inquiries.

A few orders and several inquiries are reported as having come from South America, and these are regarded as a forerunner of more business from that source. There is a greater feeling of optimism in the trade at this time than there was at the beginning of last year, and it is freely predicted that the industry will make a good showing in 1927.

Factory output continues to be at a normal level and no decrease in manufacturing activities is expected, as orders on hand will keep plants busy for some time. Manufacturing conditions are favorable.

NEW YORK

Machine tool and machinery business in this market is following closely the trend of industrial activity. Manufacturing plants in most lines are busy and while few large expansion programs are under way at the present moment, there is enough replacement going on to furnish a good volume of orders for agents and dealers in shop equipment. Sales resistance from buyers is becoming weaker, it is said, as the need for greater and more economical production becomes necessary because of competition.

The D. L. & W. inquiry for some thirty tools is reported about to be closed. The General Electric Co. is asking quotations on a list of miscellaneous tools for three of its plants. It is worthy of mention that in the past few months many machine tool builders have purchased new machinery of a high production character.

The Ludlow Valve Co., the Illinois Steel, Sullivan Machinery Co., Southern Wheel Co., J. G. White Corporation, Bullard Machine Tool Co., Western Electric Co., the New Departure Manufacturing Co., and the Westinghouse are mentioned as recent buyers in this market.

NEW ENGLAND

The machinery builders in the Connecticut section of New England observe that business is now swinging into the 1927 stride and the volume continues apace with the conditions generally prevailing in the latter half of 1926. It is the opinion of executives interviewed that the business booked is on a par with that prevailing recently and the inquiry volume is equally good. Inquiries lead to the conclusion that there will be a substantial volume of business for some time to come.

Small tool manufacturers state that business is excellent and the major part of this demand is largely of a replacement variety. Hand tool makers are busy.

CLEVELAND

The new year has opened auspiciously for the local machine tool industry. Business picked up immediately after the first of the year and is gaining each day. If the first ten days of the new year are to be used as a criterion for the coming year, a record for sales of machinery and machine tools is in prospect. A large volume of inquiries is on hand and it is believed that January will be one of the big months of the year.

A large portion of recent buying has been done by automotive accessory concerns. The W. S. Tyler Co., General Electric Co., and the New York Central R.R. were recent buyers in the Cleveland market.

Industrial production is on the increase, according to the Chamber of Commerce, which reports that twenty-one leading industrial plants are planning increases in working forces during January. The Fisher Body-Ohio Co., recently returned 4,500 workers and the normal force of 6,000 will be at work by February first.

MILWAUKEE

An encouraging sign in the metal working equipment market is the rapid recovery from the holiday lull. Activity is greater than that apparent during the late fall and early winter months. The automobile industry is responsible for a considerable part of the increasing inquiry, and while its character suggests a replacement demand, it likewise refers to items designed to bring about increased production.

Sales so far in January have been of relatively small volume, yet sufficient business has been booked to sustain production of tools at close to the December average. If buyers act upon responses to inquiry in the favorable manner in which indications are regarded, the rate of output probably will take a gradual upturn.

There is no shortage of skilled mechanics as during the greater part of 1926, but the absorption of the supply by industries generally is again creating a problem for the machine tool trade. Employment generally is gaining, with the important automobile parts and equipment industry of Milwaukee increasing schedules to meet specifications from automobile and truck manufacturers.

Inquiry from railroads is improving satisfactorily and this source is confidently expected to provide a greater volume of tool business than in several years.

DETROIT

Improvement in market conditions for machinery and machine tools in the Detroit district has been noted since the first of January. Veteran observers declare that present conditions, while better than those existing in December, will continue to improve slowly for the next two months. So far, the demand has been for new machinery rather than for used tools.

Inquiries are general from all the automobile manufacturers and many of these will be turned into actual orders as soon as the national automobile shows give executives a true picture of what the industry will do for this year. While no large expansion programs are underway, the tendency on the part of all those plants either in or allied with the automobile industry is to replace obsolete machinery. Replacements, it is contended, will be the big portion of the 1927 business.

Dodge Brothers is buying considerable equipment for the new line of cars, while Cheverolet is in the market for general manufacturing and production machinery. The new plants for the General Motors products at Pontiac are progressing and orders for equipment are coming through. Ford is quiet, as is Packard. Studebaker has recently added some machines to its assembly line, while Paige has bought a few single tools. General manufacturing conditions are good. Railroads are expected to buy some stuff soon, as the 1927 appropriations will be available shortly.

Business Items

The Sullivan Machinery Co., of Chicago, has moved its Butte, Mont., office to 54 E. Broadway. James G. Graham is manager.

The Campion Equipment Co., of Kenton, Ohio, has been organized to take over the Champion Engineering Co., manufacturer of cranes and machinery.

The Wallace Barnes Co., of Bristol, Conn., has purchased the cast-iron nut and bell gong business of W. C. Ladd of Bristol. Mr. Ladd has no immediate plans. Frank Moore will continue as foreman.

The Chase Companies, Inc., of Waterbury, Conn., has increased its capital from $10,000,000 to $12,000,000. The Chase Companies, Inc., acquired the business of the U. T. Hungerford Brass and Copper Co.

The Union Manufacturing Co., of New Britain, Conn., has bought the Franklin-Moore Co., of Winsted, Conn., manufacturer of hooks, hoists, locks and kindred products.

The Beaver Machine and Tool Co., of Newark, N. J., announces that the A. W. Marshall Co., of Louisville, Ky., has been appointed its agent in that state. Franklin McDermott of 610 Louderman Bldg., St. Louis, has been appointed sales representative in St. Louis.

Articles of incorporation have been filed in Indianapolis by the Midwestern Machinery Co., an Indianapolis corporation. The company will sell machinery, tools and shop supplies resulting from the purchase of manufacturing plants. The incorporators are Sylvester Johnson, Jr., B. C. Raffensperger and Harry Hildebrand.

The Air Reduction Co., Inc., has acquired through a long term lease the plants and business of the Commercial Acetylene Supply Co., on the Pacific Coast. The addition of these two plants in Berkeley and in Los Angeles, enables the former company to render a more complete service on the coast.

Announcement has been made that effective Jan. 1, Joseph T. Ryerson & Son, Inc., steel and machinery distributors, will in various important districts take over the exclusive sale of the line of milling machines produced by the Kempsmith Manufacturing Co., of Milwaukee. The Kempsmith company was recently reorganized with Robert J. Wilson becoming the new president and general manager, and Frank Wollaeger, Jr., assuming the duties of vice-president and sales manager.

The consolidation of the Seybold Machine Co., the Harris Automatic Press Co., and the Premier & Potter Printing Press Co., has been effected to make available the elements in each that will benefit the group and those using Harris, Seybold, Premier and Potter machines. The plant of the Seybold Machine Co., at Dayton, will be operated by its present organization, the sales and service of Seybold and Oswego machines being continued by the present sales connection.

The Master Electric Co., of Dayton, Ohio, held a sales convention which was attended by all district managers, factory representatives, agents, and distributors east of the Mississippi River, on Jan. 3 and 4 at the company's offices. Talks were given by officers and executives of the company including E. P. Larsh, president and general manager; W. R. Clements, vice-president and sales manager; R. E. Blackford, superintendent; and Geo. A. Arnold, advertising and sales promotion manager.

More than 200 sales representatives of E. C. Atkins & Co., met in Indianapolis recently for the annual sales convention. The salesmen spent four days at the factory. N. A. Gladding, vice-president and general manager of the company, presided at the meetings. Henry C. Atkins, president of the company, addressed the men. The convention ended with a banquet and entertainment. Atkins salesmen and district managers from all territory east of the Rocky mountains, attended the meeting.

The conveying machinery division of the Kent Machine Co., of Kent, Ohio, announces the opening of a Chicago office at 625 Monadnock Block, with F. E. Schwalb as manager and sales engineer. The Kent Machine Co. is identified with the manufacture of material handling equipment. This department of its business plays counterpart to the line of transmission machinery made by the Falls Clutch and Machinery Co., of Cuyahoga Falls, Ohio, recently purchased by the Kent Machine Co. Mr. Schwalb was formerly connected with the Weller Manufacturing Co., in the capacity of chief engineer.

Personals

W. D. EVANS and J. C. WATSON have been elected directors of the Jones & Laughlin Steel Corporation.

SAMUEL PORCHER has been appointed assistant vice-president in charge of purchasing for the Pennsylvania R.R.

F. F. FITZPATRICK, president of the American Locomotive Co., has been elected a director of the American Car and Foundry Co.

JOHN CHRISTENSEN and S. J. SORENSEN, of the Cincinnati Gear Co., sailed on Jan. 19 on the *S. S. California* for a four months tour around the world.

H. P. DAVIS, vice-president of the Westinghouse Electric and Manufacturing Co., has been elected chairman of the board of the National Broadcasting Co.

OWEN D. YOUNG, chairman of the board of the General Electric Co., has been appointed deputy chairman of the Federal Reserve Bank of New York.

CHARLES D. OSTERLEIN, vice-president and general manager of the Osterlein Machine Co., of Cincinnati, has been elected president of the Cincinnati Foreign Trade Association.

HARRY J. LACKEY, formerly with the sales department of the Bicknell-Thomas Co., has joined the sales force of the Triplex Machine Tool Co., of 50 Church St., New York, dealer in machine tools.

R. G. CONE will address the Philadelphia Section of the A.S.M.E. on Jan. 25 on the subject—"Mechanical Appliances Used in the Construction of the Main Cables of the Delaware Bridge."

C. E. PYNCHON has resigned as general manager of the Pyrotung Manufacturing Co., and director of the Pyrotung Metals Corporation, and has disposed of his financial interests in those companies.

A. S. MORE has been appointed vice-president and general manager of the Indiana Truck Corporation, at Marion, Ind., The appointment is in line with the recently adopted expansion program of the company. Mr. More was formerly president of the Selden Truck Corporation, of Rochester, N. Y.

CLARK DILLENBECK, since 1917 assistant chief engineer of the Reading Co., at Philadelphia, has been promoted to chief engineer. He succeeds Samuel T. Wagner, who has been promoted to consulting engineer. Mr. Dillenbeck is president of the Philadelphia Section of the American Society of Civil Engineers.

V. E. MCMULLEN, of Beloit, Wis., has been appointed manager of the Indianapolis plant of the Fairbanks-Morse Co. He succeeds B. J. Meyer, who has been transferred to the Chicago headquarters of the company. Mr. McMullen has been an engineer and division supervisor at the company's principal manufacturing center at Beloit for several years.

J. W. NEIDHARDT has been appointed assistant works manager of the Putnam Machine Works, Fitchburg, Mass., a subsidiary of Manning, Maxwell & Moore, manufacturing the Putnam line of heavy machine tools, and also the recently acquired Detrick & Harvey and Beaman & Smith lines of openside and standard planers, horizontal boring machines, and special milling machines. Mr. Neidhardt was formerly general manager of the Detrick & Harvey Machine Co., at Baltimore, Md.

Forthcoming Meetings

Society of Automotive Engineers. Annual meeting, Detroit, Jan. 25 to Jan. 28. E. F. Lowe, chairman, meetings and sections department, 29 West 39th St., New York.

American Railway Association. Engineering Division, March 8 to 10, at Chicago; Mechanical Division, June 7 to 10, at Montreal; Purchases and Stores Division, date and place not yet announced. H. J. Forster, secretary, 30 Vesey St., New York City.

Lyons Fair. Opens first Monday in March, and continues for two weeks, at Lyons, France. Exhibits of many products including tools and implements, industrial supplies, metallurgy and machinery. Emile Garden, 50 Church St., New York, is the representative of the fair in the United States.

American Society of Mechanical Engineers. Regional meeting, Kansas City, Mo., April 4 to 6. C. E. Davies, secretary in charge of meetings, 29 West 39th St., New York.

National Metal Trades Association. Annual convention, Hotel Statler, Detroit, Mich., April 25 and 26. J. E. Nyhan, secretary, Peoples Gas Bldg., Chicago, Ill.

American Welding Society. Annual meeting, Engineering Societies Bldg., New York, April 27, 28 and 29. M. M. Kelly, secretary, 33 West 39th Street, New York.

American Society for Steel Treating. Spring sectional meeting, Milwaukee, Wis., May 19 and 20. W. H. Eisenman, secretary, 4600 Prospect Ave., Cleveland, Ohio.

American Society of Mechanical Engineers. Semi-annual meeting, White Sulphur Springs, W. Va., May 23 to 26. C. E. Davies, secretary in charge of meetings 29 West 39th St., New York.

National Foreign Trade Council. Fourteenth national foreign trade convention, Hotel Statler, Detroit, Mich., May 25, 26 and 27. O. K. Davis, secretary, India House, Hanover Square, New York.

Society of Industrial Engineers. Annual meeting, Hotel Stevens, Chicago, May 25, 26 and 27. George C. Dent, secretary, 608 S. Dearborn St., Chicago, Ill.

National Association of Purchasing Agents. Annual meeting and "Informashow" at Grand Rapids, Mich., June 6 to 9. W. L. Chandler, secretary, Woolworth Bldg., New York City.

American Foundrymen's Association. Annual convention, Edgewater Beach, Chicago, June 6 to 10. R. E. Kennedy, secretary, 909 W. California St., Urbana, Ill.

National Supply and Machinery Distributors' Association. Twenty-second annual convention with the **Southern Supply and Machinery Dealers' Association,** and the **American Supply and Machinery Manufacturers' Association,** on board the steamship *Noronic.* Boat leaves Detroit, Mich., June 13 and returns there June 17. George A. Fernley, secretary, 505 Arch St., Philadelphia.

American Society for Steel Treating. Ninth annual convention and national steel exposition, Detroit, week of Sept. 19. W. H. Eisenman, secretary, 4600 Prospect Ave., Cleveland.

Machine Tool Exhibit. Seventh annual machine tool exhibition under the auspices of the New Haven Section of the American Society of Mechanical Engineers, the Department of Mechanical Engineering of Sheffield Scientific School, Yale University, and the Chamber of Commerce of New Haven: At the Mason Laboratory, Yale University, Sept. 6 to 9. Harry R. Westcott, chairman of the exhibit committee, 400 Temple St., New Haven, Conn.

National Machine Tool Builders' Association. First exposition of machine tools at Public Hall, Cleveland, Ohio, Sept. 19 to 24. J. Wallace Carrel, chairman of the exposition committee. Robert Everett, manager, 1328 Broadway, New York City.